Society of Forensic Toxicologists, Inc.

TOXTALK®

Volume 37, Issue 4
December 2013

YALE CAPLAN TO RETIRE AS TOXTALK EDITOR

ToxTalk has been the face of SOFT since its incorporation and I have been privileged to serve as ToxTalk Editor for 16 of those years, including the last eight years. The recent time period saw new formatting in color, electronic production allowing unlimited pages and increased coverage, general web site distribution to members and the public alike, and most lately the addition of selected product advertising. ToxTalk has enhanced SOFT's image and continues to represent the forensic toxicology community to all interested parties by providing current news, organizational bulletins, and professional and technical articles. I will be staying on as Editor Emeritus and expect to increase the focus on historical and editorial commentaries. I request our members to ponder the past and future of forensic toxicology and to contribute those types of articles to ToxTalk. Taking over as editor starting next year will be Dwain Fuller. Dwain has previously been a Section Editor and contributed regularly to ToxTalk for many years.

I also thank Laura Liddicoat, Vickie Watts, Dan Anderson, Matt Barnhill, Dwain Fuller, Bob Zettl and Nicole McCleary for all their help in the quarterly editing and production. I especially thank also Bonnie Fulmer for her constant vigil and dedication to all aspects of ToxTalk and the SOFT organization. ToxTalk is as much a passion to all of them as it has been for me. Thank you for all the fun and memories and congratulations and good luck to Dwain.

Yale H. Caplan, Ph.D, DABFT

INSIDE THIS ISSUE:

PRESIDENT'S MESSAGE

*Submitted by **Dan Anderson**, M.S., FTS-ABFT, D-ABC*

As the year slowly comes to a close, so will SOFT's 43rd year of existence and what a wonderful year it has been! As of late, our annual meeting hosted by Bruce Goldberger and Chris Chronister, was held in Orlando, FL and it was one to remember for years to come. There were close to 1,000 registrants for two days of 12 workshops and approximately 900 registrants for the scientific session that lasted the next two and 1-half days. Besides the excellent platform and poster presentations offered, there were many social opportunities to create problem-solving networks with national and international colleagues. What I found extremely gratifying, intriguing, and certainly entertaining was the ability of SOFT (with the generous support of the vendors) to purchase all the available seats of the Cirque show that immediately followed the President's reception. Typically the President's reception is a sit down dinner with an excellent live band. Although I thoroughly enjoy dancing and having a good time with my friends and colleagues, the live and often times loud music creates an attendee division and this reception loses many of the people before the night ends. However, because the Cirque show was a unique event, 900 people including SOFT members, invited guests, vendors, and families spent the entire evening together. I've attended several similar shows in Vegas and the one in Orlando was one of the best I have witnessed! For those that were there and are asking, I did not have prior knowledge of my participation on stage. At the time I thought you all were laughing at what was happening on stage with me and the performer jumping over me with his bike; I had no idea you were also watching another performer having fun sitting on my wife's lap and drinking all of my wine. What can you do? All in fun and good spirit. In all seriousness, I do appreciate the tremendous effort put forth by the Meeting Hosts Bruce and Chris, Meeting Treasurer Laurel Farrell, Vendor Liaison Jarrad Wagner, and Administrative Assistant Bonnie Fulmer, as well as the tremendous amount of work conducted by the host committee members and the numerous volunteers leading to a very successful meeting. Thank you!

This year, one of the largest accomplishments of the Board of Directors (BOD) was the recognition of our established membership. Over the past several years, SOFT tended to cater towards the younger side of our dynamic member population with the establishment of the Young Forensic Toxicologists (YFT) committee and their social event, the annual ERA and YMSA awards, and the Leo DalCortivo scholarship awards given for best platform and poster of YFT. Because the BOD felt there was a growing gap between the established and younger membership, we thought it would be an excellent idea to recognize the 'older' individuals with what became the "Membership Loyalty Service Recognition." Beginning this year and for all future years, SOFT will recognize members on their membership anniversary of 20, 30, and 40-years with a service lapel pin as well as a color coded, meeting member badge ribbon with the designation of 20, 30 or 40-year member: The recognition takes in to account the members who have demonstrated:

- Loyalty, professionalism, and ethical conduct.
- Commitment towards the SOFT organization and its strong traditions.
- Perseverance with a prosperous career in Forensic Toxicology.

This year, with a total membership of approximately 1,100 individuals, SOFT was able to recognize a total of 212 members with a service pin. There were 3 members that received the 40-year service pin (member since 1973) , 70 members that received the 30-year service pin (member since 1983) and 139 members that received the 20-year service pin (member since 1993). It's amazing to think that close to twenty percent of the SOFT population has been members for over 20 years. Also interesting to note that 6 of the 9 members of the BOD haven't met any of these bench marks yet, including me! I particularly want to thank these 20, 30, and 40-year plus members for their continued participation in SOFT – you all have pushed the Society to become what it is today, a prosperous, professional and organizational success!

PRESIDENT'S MESSAGE (CONTINUED)

Another important topic to discuss with the SOFT membership is ToxTalk, our online newsletter for communication and announcements. First, ToxTalk is now registered with the United States Patent and Trademark Office protecting us from anyone else infringing on the name. Second is the addition of advertisements to ToxTalk. While perhaps not on anyone's list of favorite things, the advertisements will provide a necessary mechanism for the vendors to communicate with the SOFT membership. The BOD carefully developed and implemented policy and procedures for advertisements into our newsletter. The membership should remember and thank the vendors for the strong financial support provided at our annual meetings. The last, but certainly not the least, important item to mention about ToxTalk is the continued thank you to Yale Caplan for his dedication as Editor of ToxTalk. Yale has had two eight-year stints of being the ToxTalk editor. However, as with all good things, it eventually must come to an end. Yale has decided to step aside to allow the BOD appointment of Dwain Fuller to take over the reins of the newsletter. Yale will continue in a limited role with ToxTalk by providing review articles. Also continuing are Laura Liddicoat as co-editor and Nicole McCleary as the publishing assistant. Huge thanks to all four of them for their continued dedication to the organization.

In closing, I want to thank the SOFT membership for their trust and for allowing me to be of service to this organization in which I hold in such high esteem. The BOD has been an absolutely wonderful group of individuals that has provided me the timely responses and guidance to problems and concerns that arose this year. I want to thank all the Committee Chairs for serving throughout the year as well as Madeline Montgomery for accepting the position of Special Editor of the Journal Analytical Toxicology. It's a very difficult task of coordination and persistence to coalesce 20 or more manuscripts, the authors, the reviewers, and the deadlines. Congratulations to the 2013 EDIT recipient Thomas G. Rosano for his publication titled, *Drug Screening in Medical Examiner Casework by High-Resolution Mass Spectrometry (UPLC–MSE-TOF).*

Although my tenure is coming to an end, I trust the BOD and incoming President Peter Stout will continue down the path of transparency, accountability, and procedural clarity to perpetuate SOFT into the future. With that I thank you again for the honor of allowing me to serve as the 2013 President and look forward to my duties as Past President. I hope that you and your families have a wonderful holiday season and a great new year. See you all in Grand Rapids, MI 2014.

Dan Anderson
2013 SOFT President

CONSOLIDATION OF THE ABFT AND FTCB

On October 31, 2013, the American Board of Forensic Toxicology (ABFT) and the Forensic Toxicologists Certification Board (FTCB) entered into an agreement in which the FTCB would be merged into and be consolidated with the ABFT. There will be a 120 day period of review, planning and due diligence, and upon completion of this period, the exact parameters of the consolidation will be announced.

The motivation to consolidate is multi-faceted – but most importantly, the ABFT and FTCB believe that the existence of two separate certification boards in forensic toxicology can cause confusion for practitioners and the communities they serve. Both Boards agreed that one unified "voice" for uniformity and standardization of qualifications and competency within our profession is needed and will benefit the profession.

Bruce A. Goldberger, Ph.D., DABFT
President

Amanda J. Jenkins, Ph.D., DFTCB
President

SOFT Annual Meeting October 19th – 24th, 2014
Amway Grand Plaza Hotel and DeVos Place Convention Center
Downtown Grand Rapids, MI

Committee Co-Chairs: **Ben Kuslikis** *and* **Mike Smith**

Scientific Program Chairs
Laureen Marinetti, Michelle Glin

Workshop Chairs
Erin Spargo, Denice Teem

Treasurer
Marc LeBeau

Vendor Liaison
Jarrad Wagner

Social Chairs
Denice Teem and Kim Daily

YFT/SSEP Coordinator
Jayne Thatcher

Volunteer Coordinator
Prentiss Jones

SOFT 2014 Website Liaison
Russell Lewis

Silent Auction Coordinator
Elizabeth Kiely

Fun Run
Vincent Papa

We are truly excited to be hosting SOFT 2014 in Grand Rapids, Michigan. We believe you will find the meeting both enjoyable and productive. Grand Rapids was named "Best Place to Raise a Family" by Forbes, thanks to numerous family-friendly events, museums, festivals and other points of interest. Points of interest include the Gerald R. Ford presidential museum and the Van Andel museum both across the river from the meeting hotel. Also of interest would be various art museums, the Frederik Meijer Garden and Sculptor Park, as well as over 80 pubs and restaurants within walking distance of the meeting hotel.

This year's SOFT "fun" theme will revolve around BEER, a topic that most forensic toxicologists have both a personal and professional interest. Grand Rapids is well known for its many microbrews, and has been dubbed "Beer City USA". It is home to the "Second Best Brewery in the World" and the "Third Best Beer Bar on Earth". One of our promotional items for this meeting is a credit card sized beer bottle opener. We are planning on having a brew bottled just for our SOFT members complete with a unique SOFT beer label.

It is not just beer. SOFT professional activities will include a foray of workshops and scientific papers and posters in keeping with SOFT's great tradition of education, professional collaboration and camaraderie.

The meeting hotel is world class. The indoor walk to the exhibit hall is relatively short and very scenic with what will be autumn views of the Grand River. Finally, exhibitors will appreciate the ease in setting up their exhibits, the exhibitor hall is spacious, while the loading docks are in close proximity to the exhibit hall.

We look forward to seeing all of you in Grand Rapids next October.

Ben and Mike

SOFT GRAND RAPIDS 2014

Workshop Proposals

Proposals for the 2014 Grand Rapids meeting are **due no later than March 14th, 2014**. The submission form is located on the SOFT website under the Annual Meetings tab and is also included in this issue starting on page 36; completed forms should be emailed to the 2014 Workshop Co-Chairs. Please notify Denice or Erin in advance if you plan to submit a proposal. Your Workshop Chairs would be happy to answer any questions you may have regarding workshops or the submission process.

2014 Workshop Co-Chairs

Denice Teem
denice.teem@nmslabs.com

Erin Spargo
erin.spargo@dallascounty.org

CALL FOR ABSTRACTS, MODERATORS AND REVIEWERS FOR THE SOFT 2014 ANNUAL MEETING IN GRAND RAPIDS, MICHIGAN OCTOBER 19 -24th

ABSTRACT SUBMISSION DEADLINE IS MAY 5, 2014

The SOFT 2014 Scientific Program Committee is requesting abstracts on all topics related to forensic toxicology. The Committee will select appropriate abstracts to be presented as either a 15 minute platform presentation or poster presentation. Refer to the SOFT website in the coming months for additional information on abstract requirements and submission.

In addition, the Leo Dal Cortivo Memorial Fund is allowing the Young Forensic Toxicologists Committee to present two awards to young forensic toxicologists at the SOFT 2014 Annual Meeting. The best platform presentation and the best poster presentation will be chosen from among the eligible entries, and the presenting author will be awarded a cash stipend of $1000 in addition to a free registration for a future SOFT meeting. For eligibility requirements and instructions on how to apply, go to the Young Forensic Toxicologists tab on the SOFT website.

Also if you would like to serve as an abstract reviewer or moderate a session at the meeting, please contact either of the Scientific Program Committee Chairs listed below.

The SOFT 2014 Scientific Program Committee Chairs are:

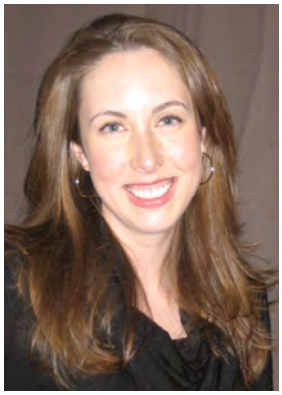
Laureen J. Marinetti
jtoximp@gmail.com

Michele Glinn
michele.glinn@gmail.com

JAT SOFT Special Issue Editor for 2014: Jayne E. Thatcher

Jayne.Thatcher@dfs.virginia.gov

Jayne E. Thatcher, Ph.D. is the 2014 Guest Editor of the Special Issue of the Journal of Analytical Toxicology (JAT). The Special Issue will be the October 2014 issue coinciding with the Society of Forensic Toxicologists (SOFT) annual meeting in Grand Rapids, MI. Manuscripts are reviewed in terms of originality, value to the field, technical content and clarity. Complete author guidelines can be found at the JAT website (**http://jat.oxfordjournals.org**). All accepted manuscripts of the October Special Issue in which the lead author is a SOFT member will be eligible for consideration of the 2014 Experimental Design and Impact on Toxicology (EDIT) Award. This prestigious award will recognize the lead author of the paper which is judged to show excellent scientific experimental design and has a wide impact on the forensic toxicology field.



JAT DEADLINES:

Title and abstract submissions due **February 28, 2014**

Completed manuscripts due **March 14, 2014**

Publication will occur **October 2014**

DRUGS IN THE NEWS

Send interesting ***"Drugs In The News"*** articles

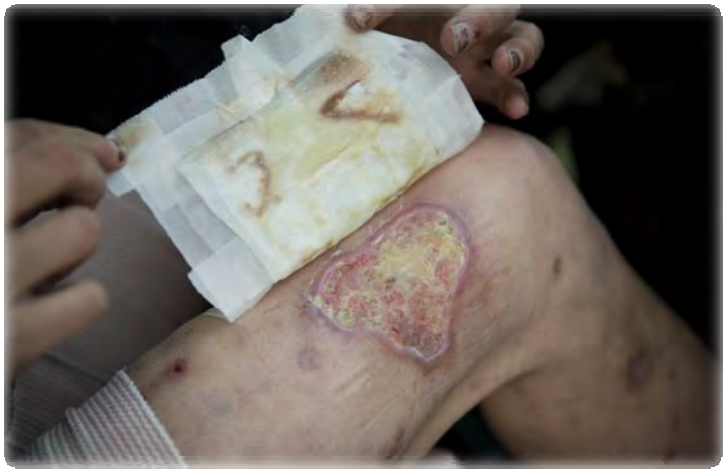
to Section Editor

Dwain Fuller, B.S., D-FTCB, TC-NRCC

Dwain.Fuller@va.gov

Krokodil and the Law of Unintended Consequences

Submitted by **Dwain Fuller**, *Section Editor*

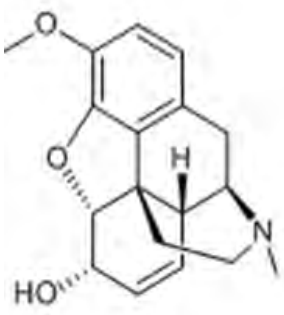


Sometimes well-intentioned actions result in unintended consequences. The field of study known as "game theory" is a formal investigation and description of such things, (i.e. when player A makes a certain move, how does player B respond?). Many times player A is a government and its law while player B represents the people affected by the law. When a government, player A, moves to influence or force people to do one thing, the people, player(s) B, often adjust their strategy and end up doing something that was unintended by player A. While this may sound like a segue into a discussion of the merits and drawbacks of the recent U.S. healthcare legislation, the focus is in fact on the other side of the globe; Russia.

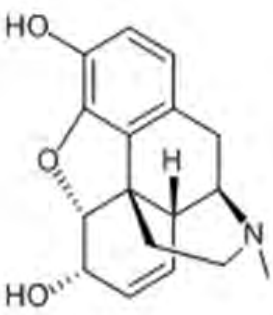
In 2003 Russia began a major crackdown on the trafficking and production of heroin, presumably in a good-faith effort to curtail its use. However, heroin users turned to other opiate sources for their needs. Clandestine chemists soon began to convert codeine, which until June 1, 2012 was available over-the-counter in Russia, to desomorphine, also known as Krokodil, or "Crocodile" in English. Many sources assert that the peculiar name comes from the scaly appearance of the skin that often results from desomorphine abuse. However, it seems more likely that the name derives from one of the chemical precursors of desomorphine, α-chlorococide, which when spoken aloud sounds reminiscent of "crocodile".

Desomorphine is a derivative of morphine in which the 6-hydroxyl and the 7, 8 double bond have been reduced. Desomorphine is not a new drug; it was patented in 1932 and is reported to be around 8-10 times more potent than morphine, with a fast onset and short duration of action. As was the case with crack cocaine, the combination of increased potency and shorter duration of action, may be the recipe for higher addiction liability.

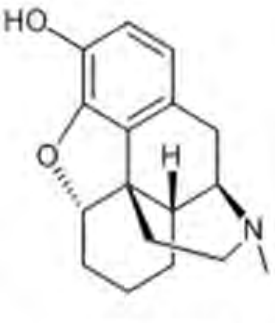
Desomorphine can be synthesized from codeine in a reduction reaction similar to that of reducing ephedrine/pseudoephedrine to methamphetamine; employing red



codeine



morphine

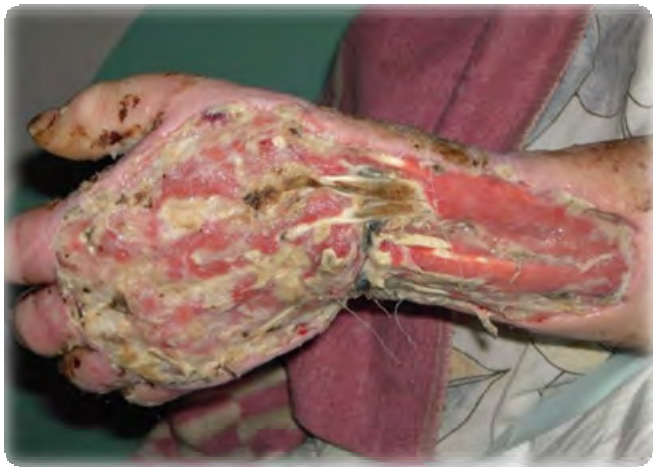


desomorphine

Krokodil and the Law of Unintended Consequences *(Continued)*

phosphorous and iodine. One account of the clandestine synthesis is that 5 – 10 codeine-containing tablets are boiled with paint thinner and lighter fluid or gasoline, along with hydrochloric acid, iodine, and red phosphorous obtained from the striking surface of matchboxes. This reportedly results in a suspension of desomorphine along with all the reactants, solvents, and precursors.

Desomorphine has gained media notoriety due to the severe tissue necrosis that is often associated with its use. The cause of the tissue necrosis is most likely not from the drug itself, but rather the chemical impurities that remain in the mixture after it is prepared from codeine. Besides the direct effect of these harsh chemicals on veins and tissue at the injection site, unfiltered particulate matter may be transported some distance from the injection site before causing a thrombosis. The effects of desomorphine are short-lived, yet the synthesis from codeine can be accomplished in less than one hour, therefore addicts tend to inject the quickly-prepared drug mixture with no prior purification. It is this author's observation that due to the addiction liability of the drug along with its short duration of action, Krokodil abusers may also, as is seen with heroin, be "skin-popping" the drug to extend its effects and ward off withdrawal. This would, of course, further exacerbate the tissue necrosis. Regardless, the effects of these injections can be devastating to the underlying tissue, as the accompanying pictures, which are rather tame by comparison to many on the web, will attest.



At this writing, the use of desomorphine in the United States seems to be minimal. News accounts of its presence in the U.S. are largely unverified. An admittedly unscientific poll of attendees of the Elmer Gordon Forum at the SOFT meeting in Orlando, failed to identify anyone who had encountered it. A monograph produced by the U.S. Drug Enforcement Administration (DEA) in October 2013 states that in 2004 two exhibits were identified as desomorphine and none since.

Perhaps the fact that codeine is not available over the counter in the U.S., along with the media frenzy of the terrors of this drug, will prevent it from taking hold in the U.S. In the meantime, desomorphine and its deuterated analog are now commercially available, should laboratories wish to be proactive in developing methods for its detection and quantitation.

References and Further Reading

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TECHNICAL ARTICLES

Dietary Supplement Tests Positive for Prescription Diuretic

Submitted by **Amy B. Cadwallader, Ph.D., Melinda K. Shelby, Ph.D., Elizabeth M. Stapleton, BS, Lora McCord, MS, David L. Black, Ph.D., DABFT**

Aegis Sciences Corporation, Nashville, TN

Introduction

The Dietary Supplement Health and Education Act of 1994 (DSHEA) states that manufacturers are responsible for ensuring that the contents of a dietary supplement and its label information are accurate before reaching the public. However, a supplement manufacturer is not required to get FDA approval prior to marketing or selling its product. The FDA is responsible for taking action against dietary supplement manufacturers only after their products reach the market and are found to be mislabeled, contaminated, or formulated to intentionally contain prescription drugs or other illegal pharmaceuticals. Testing only occurs for a small percentage of products and may only be initiated after an adverse event report. In the period January 2004 through December 2012, 51% of drug recalls were for dietary supplements, yet this recall rate is believed to under-represent the products on sale with unapproved ingredients.[1]

Figure 1. Hydravax® dietary supplement purchased from metabolicnutrition.com and tested for triamterene.

The dietary supplement industry has continually developed, marketed and sold products containing ingredients that are not listed on the label. Many of these products, such as those marketed for weight loss, advertise the rapid elimination of weight or water weight and the reduction of bloating and swelling. Previously, other laboratories have detected the presence of the prescription diuretic bumetanide in an over the counter dietary supplement marketed as a diet aid.[2] Diuretics may be used by athletes to excrete water for rapid weight loss and/or to mask the presence of other banned substances. Because of their abuse by athletes , diuretics have been included on the banned substance lists of many sporting organizations including the World Anti-doping Agency[3] and are routinely included in testing by anti-doping laboratories.[4] Strict liability regulations in sport require athletes to be responsible for what they put into their bodys. Thus, administration of a product that is mislabeled or contaminated could result in a positive drug test and subsequent banning from competition. Additionally, administration of mislabeled or contaminated products may pose health risks.

Recently, the supplement Hydravax® was tested at Aegis Sciences Corporation. Hydravax® (Fig-ure 1) claims to be “the most powerful and effective ONE DOSE DAILY - high potency diuretic weight loss solution ever developed.” Although its label touts that the product is “pharmaceutical grade,” it does not list any prescription diuretic among its ingredients (Figure 2). Triamterene is a prescription potassium-sparing diuretic used alone or with other medications to treat hypertension and edema (fluid retention), which may be caused by a variety of conditions including liver or heart disease.[4] It causes the kidneys to eliminate unneeded water and sodium from the body into the urine, but reduces the loss of potassium. Minor


HYDRAVAX
High Potency Diuretic Weight Loss Solution
pharmaceutical grade

SUPPLEMENT FACTS

Serving size: 1 Capsule — Servings per container: 45

	Amount Per Serving	% DV
Hydravax® High Potency Diuretic Weight Loss Solution		
Proprietary Blend	750 mg	
Dandelion Root (Standardized 50%)		**
Uva Ursi (39% Stand Arbutin)		**
Methylxanthines		**
Magnesium		**
Green Tea Extract (50%/35% polyphenols)		**
Asparagus Concentrate		**
White Willow Bark		**
Cranberry Powder		**
Couch Grass		**
Corn Silk		**
Juniper (4:1 Extract)		**
Hydrages (4:1 Extract)		**
Buchu (4:1 Extract)		**

** No Daily Value Established

Other Ingredients: Dipotassium Phosphate, MCMC, Silicon Dioxide, Magnesium Strearate, Titanium Dioxide, FD & C Blue 1, TiO2, Gelatin.

Store product at room temperature. Do not expose to excessive heat or moisture.

Figure 2. Hydravax® label showing ingredients.

Dietary Supplement Tests Positive for Prescription Diuretic *(Continued)*

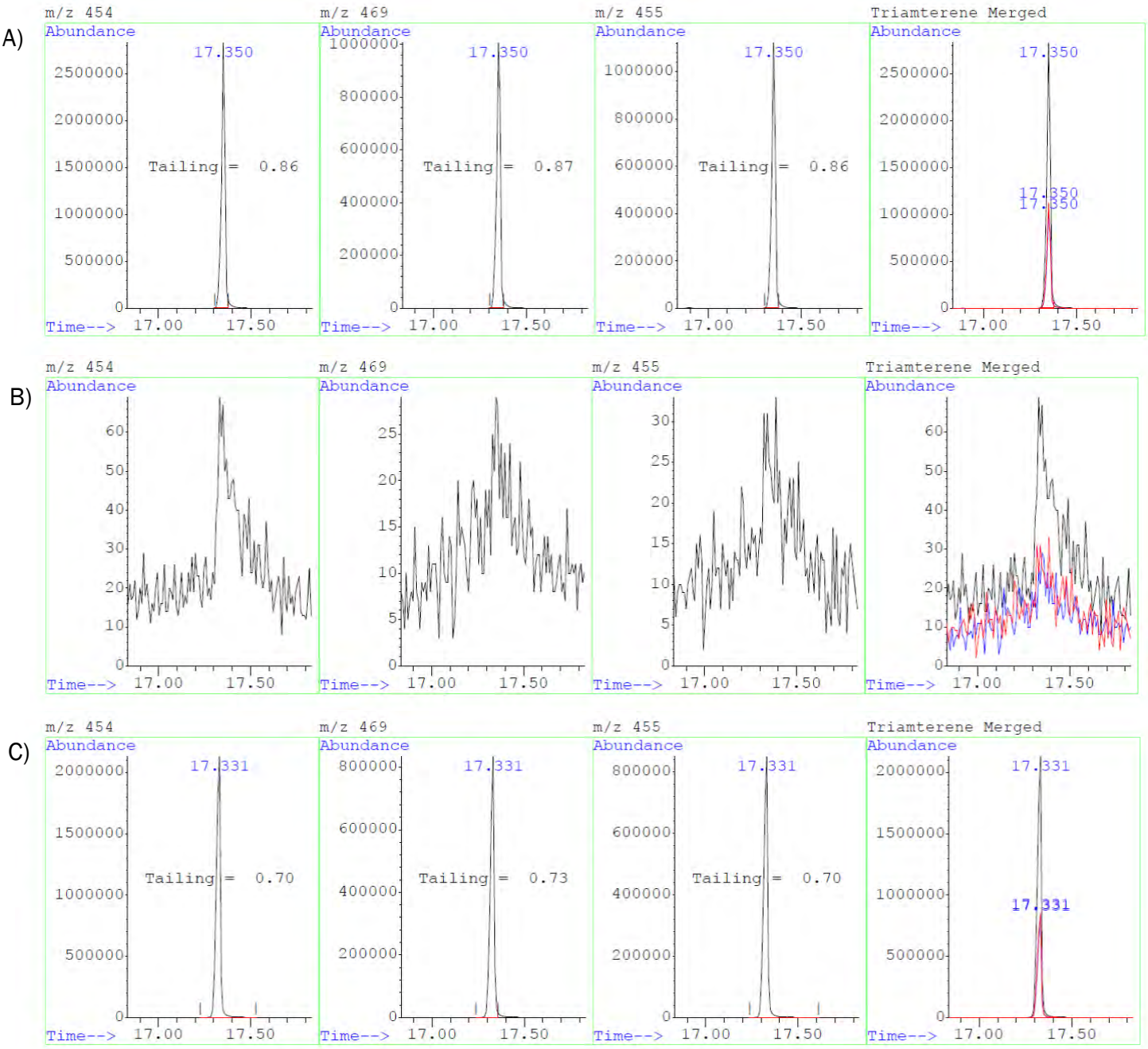

Figure 3. GC/MS Selected Ion Monitoring of Hydravax® a.) Supplement containing triamterene b.) wash c.) triamterene 100 µg/mL standard.

Dietary Supplement Tests Positive for Prescription Diuretic *(Continued)*

side effects include vomiting, dizziness, and headache. More severe side effects include electrolyte imbalances which can lead to hyperkalemia. These can be increased with kidney failure or dehydration.

Case Study #1

A urine specimen tested positive for the banned substance triamterene, a prescription diuretic, and the donor claimed he never took the drug. He was, however, taking a dietary supplement, Hydravax®, that he subsequently sent to Aegis for testing. Aegis tested the athlete's Hydravax® product. Because the product received was an opened container, Aegis independently purchased Hydravax® with the same lot # and expiration and tested the sealed product.

Case Study #2

A fitness instructor and bodybuilder was disqualified from a fitness/bodybuilding contest after testing positive for triamterene. She disputed the finding, claiming to be 'all natural' and said that she did not use any pharmaceutical products. She did state that she used the dietary supplement Hydravax® prior to her competition. She contacted Aegis because she saw announcements of our previous Hydravax® test results. She sent in her opened bottle of Hydravax® for testing. Aegis tested the athlete's Hydravax® product (it was the same lot # as the other 2 bottles tested).

Materials and Methods

The two Hydravax® products were submitted for testing from two separate clients. Additionally, an independent product was purchased from www.metabolicnutrition.com . All three Hydravax® products have the same lot # and date of expiration. The triamterene reference standard was purchased from Altech (Deerfield, Illinois).

Upon receipt of the dietary supplements, the products were photographed and documented utilizing chain of custody procedures. The contents of the supplement bottles were weighed (total number of pills). For standard sample processing, 10 pills (unless 10 pills are not available) were taken and homogeneously mixed; specimens were analyzed in duplicate 100mg aliquots of mixed sample. However, in case study #2 only three capsules were tested because that is all that was available from the client. For extraction, 1mL of methanol was added to each 100mg sample aliquot of Hydravax®, the samples were vortexed 30 seconds, rotated 10 minutes, allowed to sit at room temperature for 45 minutes, vortexed for 30 seconds, rotated 10 minutes, and centrifuged 10 minutes at 3000rpm. A 50 µl portion of the extracts was pipetted into vials, appropriate internal standards and controls (100 ug/mL retention time standard/calibrator) were added, the samples were dried down and derivatized with N-Methyl-N-(trimethylsilyl)trifluoroacetamide/iodotrimethylsilane (MSTFA/ITMS). Finally, the samples were analyzed via GC/MS (Agilent 6890 GC and 5975 MS).

Results

For Case #1, Aegis tested the donor's Hydravax® product and detected the presence of triamterene at approximately 8000 ppm (data not shown). Additionally, Aegis purchased an independent product (same lot #) and detected triamterene at approximately 8000 ppm, as well (Figure 3). For Case #2, Aegis tested the athlete's Hydravax® product and detected the presence of triamterene at approximately 7800 ppm (data not shown).

Conclusion

Aegis tested three different bottles of Hydravax®, all the same lot #, two of which were previously opened. Aegis detected the prescription diuretic triamterene at approximately 8000 ppm in each of the Hydravax® supplements. The concentrations of triamterene detected in the Hydravax®'s products are not consistent with inadvertent contamination.

References

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4. Cadwallader, A.B., de la Torre, X., Tieri, A., and Botre, F. The abuse of diuretics as performance-enhancing drugs and masking agents in sport doping: pharmacology, toxicology and analysis. *Br J Pharmacol*. 161: 1-16 (2010).

Examining Reasons for Normetabolite Validity in Pain Management Drug Testing

Submitted by **Ali Roberts, Pharm.D.; Dag Abebe, Pharm.D. candidate; Anne Z. DePriest, Pharm.D., BCPS; David L. Black, Ph.D., DABFT; and Yale H. Caplan, Ph.D., DABFT**

Aegis Sciences Corporation, Nashville, TN

The United States is a nation of mass opioid consumption, and the fallout is profound. Statistics assert that, although the U.S. comprises only 4.6% of the world's population, residents consume 80% of the global supply of opioids including 99% of the hydrocodone produced.[1-3] The nation has come a long way since 2000 when the Joint Commission noted in its pain management standards "there is no evidence that addiction is a significant issue when persons are given opioids for pain control."[4] In 2010, enough opioid medications were sold in the U.S. to give every adult the equivalent of hydrocodone 5 mg every 4 hours for 1 month, a 300% increase in sales over 11 years.[5] With the chronic use of opioids for non-cancer pain, we are now facing an epidemic with increasing rates of drug overdose death, emergency department visits, and misuse for nonmedical reasons.

In this age of opioid inundation and overexposure, the practice of pain management presents numerous challenges. Several drugs utilized for pain are not therapeutically optimal as a first-line choice and have a high potential for abuse. Many clinicians have reported potential diversion of these medications and concurrent illicit drug use, which exemplifies the need for compliance monitoring. One pain management center reviewed eighteen months of data and found that 14.7% of patients were potentially diverting drugs, 28.7% were positive for nonprescribed or illicit drugs, and the total rate of oral opioid misuse was 40%.[6,7] A recent study by Quest Diagnostics indicates aberrant urine drug test results in 60% of pain management specimens tested.[8] Consequently, routine urine drug testing (UDT) has been incorporated into national and state guidelines for practitioners who utilize opioids in the management of chronic pain.[9]

However, UDT presents many additional considerations, including determinations of which medications and metabolites to include in analysis, methodology (immunoassay versus mass spectrometry methods), and frequency of testing. Healthcare practitioners may not be familiar with the importance of mass spectrometry testing for opioid normetabolites, and there is a common misconception that parent drugs should usually (if not always) be detected in urine specimens of patients taking opioids habitually. The limitation that many laboratories are still not routinely including opioid normetabolites in their testing profiles compromises the efficacy of drug testing in clinical practice, though some laboratories specializing in pain management have begun implementing such testing in recent years. Given these considerations, and the frequency of opioid prescribing and abuse, it is prudent for laboratory experts and healthcare practi-

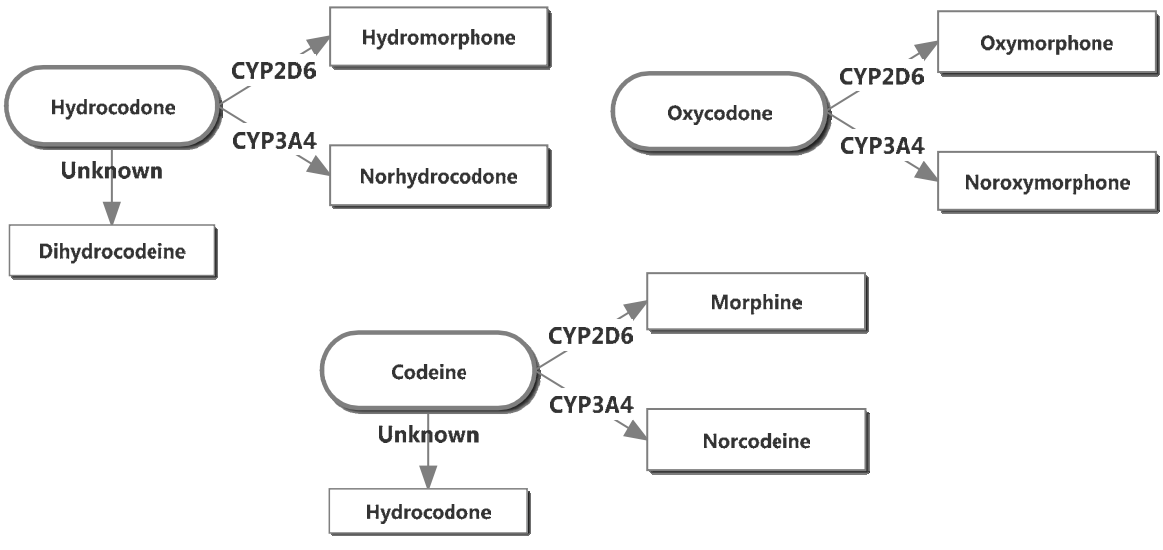

Figure 1. Metabolism of Hydrocodone, Codeine, and Oxycodone[10]

The normetabolites (norhydrocodone, noroxymorhone, and norcodeine) are specific biomarkers for their respective parent drugs; whereas, hydromorphone, oxymorphone, dihydrocodeine, and morphine are metabolites that are commercially available in prescription drug products.

Examining Reasons for Normetabolite Validity in Pain Management Drug Testing *(Continued)*

tioners to carefully examine the disposition of normetabolites in human specimens submitted for drug testing.

Depending on the enzymatic pathway, the opiate metabolism yields unique biomarkers specific to parent drug ingestion (normetabolites) or pharmaceutically active compounds that are commercially available (Figure 1).[10] For example, in addition to its specific biomarker norhydrocodone, hydrocodone is metabolized to hydromorphone (Dilaudid®, Exalgo®) and dihydrocodeine (Synalgos-DC®, Trezix®). It is a fairly common occurrence that UDT results exhibit high concentrations of metabolites without any evidence of the parent drug, making it difficult to distinguish which drug was ingested. Furthermore, failure to consider metabolite testing can result in false negatives, which may unfairly implicate diversion or noncompliance.

In clinical practice, patients suffering from chronic pain may be taking medications or ingesting food items that can interfere with the metabolism of opioids. Concurrent use of CYP3A4 inducers can rapidly metabolize parent drugs to their respective normetabolites, resulting in the absence of parent drug in a UDT result.[11] In such cases, patients may not be experiencing pain relief, as the normetabolites are not usually therapeutically active. The impact of drug-drug interactions may be underestimated, with clinicians identifying interaction potential in less than half of cases.[12] In addition, many CYP3A4 inducers are commonly employed in clinical practice, especially in pain management, including anticonvulsants (e.g., carbamazepine, oxcarbazepine, phenytoin, and phenobarbital) for neuropathic pain syndromes, antiretrovirals for HIV/AIDS (e.g., amprenavir, efavirenaz, and nevirapine), topiramate for migraine prophylaxis, and the dietary supplement St. John's Wort for depression.[13-16] For example, one of our practices (a palliative care clinic with a high HIV-positive population) recently reported that a number of their patients on efavirenz-based regimens were describing inadequate pain relief; additionally, the clinic noted that one of their patients had unexpectedly tested negative for prescribed opioids fentanyl and oxycodone following immunoassay screening. Upon further investigation by testing with mass spectrometry methods, the normetabolites norfentanyl and noroxycodone were the only compounds present. This scenario further demonstrates the need for normetabolite testing and confirmation by mass spectrometry, as normetabolites may not be detected on immunoassay screening, leading to false negatives.[17-19]

A study examining urine specimens obtained from patients taking prescription opioids revealed 943 patients (14.4%) and 702 patients (12.2%) had UDT results that were positive for norhydrocodone and noroxycodone respectively, in the absence of any detectable parent drugs (Table 1).[17,20] Furthermore, pain management patients frequently presented with urine specimens that were positive for the normetabolite only without any other metabolites detected.[17,20] In many of these cases, detection of normetabolite as a unique biomarker with other pharmaceutically-available metabolites assisted with interpretation of patient compliance.

Drug/Metabolite	# Positives	% Parent without Normetabolite	% Parent + Normetabolite	% Normetabolite without Parent*	% Normetabolite without Parent or Other Metabolites
Codeine/ Norcodeine	275	81.8	15.3	2.9	2.2
Hydrocodone/ Norhydrocodone	6538	17.8	67.7	14.4	8.9
Oxycodone/ Noroxycodone	5748	17.2	70.5	12.2	6.1
Buprenorphine/ Norbuprenorphine	650	4.2	86.8	9.1	9.1
Fentanyl/ Norfentanyl	314	38.9	31.5	29.6	29.6
Meperidine/ Normeperidine	451	4.7	45.7	49.7	49.7
Methadone/EDDP**	150	18.7	73.3	8.0	8.0

Table 1. Relative Parent and Normetabolite Distribution for Opiate and Opioid Drugs[17,20]
*Other metabolites may also be present.
**EDDP is 2-ethylidene-1,5-dimethyl-3,3-diphenylpyrrolidene (normetabolite of methadone).

Examining Reasons for Normetabolite Validity in Pain Management Drug Testing *(Continued)*

Other studies have focused on excretion patterns of oxycodone and hydrocodone following single-dose administration and found that normetabolites have higher peak concentration and longer detection times than their respective parent drugs.[21-23] Some specimens contained only metabolites later in the excretion phase, more specifically after 24 hours post-dosing.[22-23] However, it is notable that some specimens revealed only normetabolites present very early on in the excretion pattern, as quickly as six hours following dosing of immediate-release hydrocodone 20 mg.[23] These studies were limited to a small number of healthy volunteers; therefore, the rapidity with which normetabolites may be detectable in absence of parent drug remains mostly unknown in the larger pain management population, and practitioners should use caution when using testing programs which are effectively limited to parent compounds.

As stated previously, normetabolites often do not screen positive on immunoassay, due to low or non-existent cross-reactivity. Most opiate and opioid immunoassays are targeted to parent drugs, with cross reactivity to normetabolites typically less than 0.1%.[17, 24-28] For instance, norhydrocodone is commonly omitted entirely from listed cross-reactivity on immunoassay package inserts. This is extremely problematic, given the high prevalence of normetabolite-only results.

Of note, normetabolite testing is not offered by every laboratory that performs confirmatory testing by mass spectrometry methods, as there is a lack of direct financial incentive. Nevertheless, normetabolite testing is crucial for assessing opioid compliance. A false negative can jeopardize the patient-provider relationship and cause undue duress for the patient. Non-compliance is often documented in the patient's medical record, hindering the ability to seek care from other providers. Therefore, it is critical that providers assess whether or not a laboratory offers normetabolite testing through mass spectrometry and utilize test results accordingly.

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Synthetic Cannabinoids Lead to Vehicular Homicide

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No, Dorothy, synthetic cannabinoids are not just strong marijuana! This is the message we, as toxicologists, must repeatedly tell the media and inform the public. Just because some of these drugs can be purchased over-the-counter as bath salts, it does not mean that they are free of highly toxic side effects and the capacity to cause death both directly and indirectly. This case involved the synthetic cannabinoid, XLR11, an aminoalkylindoles, the largest group of synthetic cannabinoids among the 7 major structural groups often used to describe the chemical structures of synthetic cannabinoids. These groups include: naphthoylindoles (JWH-018, JWH-073, and JWH-398), naphthoylmethylindoles, naphthoylpyrroles, naphthylmethylindines, phenylacetylindoles (or benzoylindoles) (e.g., JWH-250), cyclohexylphenols (e.g., CP 47,497), and classical cannabinoids (e.g., HU-210). Some scientists break the seven structural groups listed above into three groups: classical cannabinoids, cyclohexylphenols and aminoalkylindoles.

Synthetic Cannabinoids Lead to Vehicular Homicide *(Continued)*

Case Study

A group of 6 young men and women in their mid-20s were out socializing one evening. On their way home, one of the passengers pulled out a bag containing a vegetable-like material described as a "synthetic cannabinoid." She proceeded to roll a "joint" and began passing it around for her friends to share. The driver took 3 "hits" from the joint and passed it along to another friend.

After smoking the synthetic cannabinoid, the driver allegedly ran 3 stoplights and then, according to the police report … failed to negotiate a curve, crossed over the double yellow line in the middle of the roadway, crossed through the northbound lane, continued over the sidewalk, striking several vinyl posts. According to the accident reconstruction report, "… there was no physical evidence on the road that indicated the driver attempted to negotiate the curve… no physical evidence of a critical speed yaw, no scuffing from rotation and no skid marks that would have indicated that the driver took any defensive or protective action prior to the impact.

The accident reconstruction report indicated that the movement of the car, just prior to hitting the tree, was pretty much a straight line from its position where it left the bend in the highway till the time the car came to rest, lodged against the tree. One survivor testified at the grand jury hearing that the driver was unable to hear or respond to the shouts of his name from his fellow passengers. This most likely was due to a continued decrease in his level of consciousness, due to the intensifying effect of the synthetic cannabinoid. Instead of slowing down, at one time prior to the crash, one grand jury witness testified that she perceived the car speeding up. This speeding up most likely represented a further decrease in consciousness as the driver passed from semi-consciousness to unconsciousness, where he was no longer able to support his body in any way and his center of gravity changed, as he slumped forward on the steering wheel causing his foot to further depress the accelerator pedal.

The witness who testified at the grand jury hearing testified that she fell asleep following one "hit" of the synthetic cannabinoid, and the driver inhaled at least 3 hits of the same synthetic cannabinoid.

The driver exhibited a continuum of descending levels of consciousness which culminated in his inability to respond to commands or control the motor vehicle he was driving. This is a very different scenario from simple impairment which most often presents itself with a driver weaving from left to right or crossing over a white or yellow line on the highway. The driver did not weave while driving, instead, he appears to have been frozen behind the wheel and unable to move, steer, break or take any other defensive action which might have averted the collision with the tree. The lack of skidmarks or any indications of the driver's attempt to control the vehicle were absent, indicating that the driver was not conscious during the time his vehicle left the road and headed for the tree. This is reinforced by the driver's inability to respond to his name or to recognize the gravity of the impending collision with the tree.

The crash resulted in the deaths of 2 passengers and caused one young woman to become paralyzed from the waist down, a tragic ending for a group of friends out to enjoy themselves for the evening. The driver has been indicted for vehicular homicide.

Why is smoking synthetic cannabinoids is more dangerous than smoking marijuana?

The structures of synthetic cannabinoids differ markedly from the structures of naturally-occurring cannabinoids that are found in the marijuana plant, *Cannabis Sativa*. Currently, most synthetic cannabinoids fall into one of seven major structural groups: naphthoylindoles (JWH-018, JWH-073, and JWH-398), naphthoylmethylindoles, naphthoylpyrroles, naphthylmethylindines, phenylacetylindoles (or benzoylindoles) (e.g., JWH-250), cyclohexylphenols (e.g., CP 47,497), and classical cannabinoids (e.g., HU-210). Some scientists classify the groups into three categories: classical cannabinoids, cyclohexylphenols and aminoalkylindoles, the largest group, and the group to which XLR11 belongs. In contrast to the naturally-occurring cannabinoids which have a dibenzopyran nucleus and contain no N in their structure, 4 of the remaining 6 classes are indole derivatives and the remaining 2 are naphthyl-derivatives. Using the 3-group classification, the structures of common synthetic cannabinoids are shown in the accompanying table, which was graciously provided by Heather L. Harris, MFS, JD, D-ABC, to whom I am very grateful.

The indoles are related to the structures of LSD and dimethyltryptamine (DMT) which most like-

Synthetic Cannabinoids Lead to Vehicular Homicide *(Continued)*

ly contributes to their increased potency and hallucinogenic effects, in comparison to naturally-occurring cannabinoids.

The names or designations of the synthetic cannabinoids frequently have been derived from their discoverer or manufacturer. HU-210 is named for Hebrew University, where it was synthesized by Rafael Mechoulam in the 1980s. The CP compounds, or cyclohexylphenols, were developed by Pfizer pharmaceutical company as pain relievers in the late 1970s and named CP for Charles Pfizer, with CP-47, 497 representing the prototypical drug. The class of aminoalkylindoles frequently bear the initials JWH, representing Clemson University Prof. John W. Huffmann who first developed the JWH series in the late 1990's. This series originally included JWH-018, JWH-073, and JWH-200. Another class of synthetic cannabinoids, the phenylacetyliIndoles, often bears the designation RCS, which stands for Research Chemical Suppliers, of which RCS-8 is a prototypical example. Other synthetic cannabinoids include the benzoylindoles, which may bear a designation beginning with AM, which stands for Alexandros Makryannis, a synthetic organic chemist. Typical synthetic cannabinoids from this series include AM-694, AM-2201 and AM-1221. Agents designated as "Win" such as Win-55,212-2, an aminoalkylindole, were developed by Winthrop Labs., which used to be known as Sterling-Winthrop Pharmaceutical Company. Winthrop went on to synthesize more than 100 aminoalkylindole derivatives.

If the structures of synthetic cannabinoids differ so much from marijuana, why are they called cannabinoids?

According to the federal analog act, a controlled substance may be described as an analog of another group of illicit drugs if:

1. the chemical structure of which is substantially similar to the chemical structure of a controlled substance in schedule I or II, and
2. which has a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to or greater than the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance in schedule I or II or
3. with respect to a particular person, which such person represents or intends to have a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to or greater than the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance in schedule I or II.

In addition to binding to the CB-1 cannabinoid receptors in the brain, synthetic cannabinoids have a depressant, or hallucinogenic effect on the central nervous system that is substantially similar to or greater than the depressant, or hallucinogenic effect of THC on the central nervous system. Some have called this class of drugs synthetic marijuana, but this terminology should be avoided as it implies that these drugs are "just potent marijuana" and this could not be further from the truth!

And so my fellow forensic toxicologist colleagues, this is my story about the dangers of synthetic cannabinoids, and I'm sticking to it!

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CASE NOTES

Send interesting *"Case Notes"* to Section Editor

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Drowning? (Part II)

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This article is a follow up to "Drowning?" published in ToxTalk, Volume 35, Issue 3 (12/2011)[1]

Introduction

Dichloromethane (methylene chloride, DCM) is a colorless volatile organic compound used primarily as a commercial and industrial paint remover, degreaser, aerosol propellant, and solvent.[2] Due to its high volatility, it poses an acute inhalation hazard which can result in potential blackouts, optic neuropathy and, hepatitis. Adding to its damaging effects, DCM metabolizes to carbon monoxide in the body, leading to carbon monoxide poisoning with prolonged exposure at high concentrations.[3]

It has been documented that materials containing DCM have been used to strip paint, degrease valve fittings, and remove corrosion on SCUBA tanks.[4] When doing so, it is necessary to ensure no residual DCM enters the dive tank through the air intake fittings. When filling SCUBA tanks, the air quality surrounding the compressor must be free of any volatile organic compounds to guarantee none is introduced into the tank.

Case History

The body of a 60-year-old female was recovered from the sea off River Bay, Saint Lucy, Barbados after she failed to surface following a scuba diving expedition. She was a member of a small group of divers who had indicated prior to the dive that she would like to return to the surface approximately 10-15 minutes into the 60' dive. After giving an "OK" signal to her dive buddy, she was given permission to dive alone. According to her computer's dive profile (Figure 1), she descended for about 2 minutes to 42' where she presumably started to experience problems, ascended briefly to 27' activating an ascent alarm, and then fell to 66' 3 minutes into the dive; it is believed that she became unconscious during this descent. One minute later, she fell to 90' to the ocean floor until she was recovered 14 minutes later by members of her dive group. Her body was recovered with the facemask still in place, but with the air supply disconnected.

Autopsy

During the autopsy, it was noted that the brain and lungs were moderately edematous and the stomach contained approximately one liter of a watery fluid. The cause of death was determined to be drowning; however, the factors precipitating the terminal event required further investigation. Biological specimens including blood, vitreous humor, brain, and liver were collected and sent to the Miami-Dade Medical Examiner Toxicology Laboratory for a comprehensive toxicological analysis. Upon receiving, the specimens were stored at 4°C before being submitted for analysis.

Drowning? *(Continued)*

Postmortem Toxicology

The drugs identified in the blood and liver homogenate (Table 1) were consistent with medications taken by the decedent for a cold. After these initial toxicological findings were reported, it was requested that the SCUBA tank the victim used during her dive be sent to the Miami-Dade Medical Examiner Toxicology Laboratory for further testing.

Upon arrival of the SCUBA tank, it was signed into evidence and submitted for analysis. A SCUBA regulator with a first stage, a primary and alternate second stage, a pressure gauge console, and a low pressure inflator hose was installed to the tank valve, and it was noted that 825psi of air remained in the tank. A specialized adapter was fitted to the low pressure inflator hose for a controlled flow to transfer a sample of the tank contents to a headspace vial. The case was analyzed by SPME-GC/MS alongside a DCM standard for retention time comparison (Figure 2). After analyzing the data, it was determined that DCM was present in the dive tank.

Quantification of DCM/ Discussion

The question of the source of DCM has been answered, but the questions of how it was introduced and how much DCM was introduced in the tank still remain unanswered. Knowing this might provide an answer as to whether it was intentional or an accident; was this homicide or an accidental exposure to the toxic gas?

In an attempt to quantify the gaseous DCM in the tank, the Miami-Dade Medical Examiner implemented an adaptation of its "Volatile Substances Quantitation by HS-GC-FID" method modified to work with a gas instead of liquid volatiles.

Methodology

1mL aliquots of pure liquid DCM (n=4) and Chloroform ISTD (n=6) were added to a series of separate 20mL HS vials and capped. After equilibrating to room temperature (22.5°C) for thirty minutes, known volumes of DCM headspace (50, 100, 250, and 500µL) were respectively transferred to 4 empty sealed HS vials with a gastight syringe for use as calibrators. Using another gastight syringe, 100µL of Chloroform headspace were transferred to each of the 4 "calibrator" HS vials as well as to two empty capped HS vials for the case sample and a blank.

To sample a known volume of the contents of the SCUBA tank at atmospheric pressure, a modified 250mL glass bulb with a rubber syringe port was pressurized with the gas from the tank and then allowed to slowly vent to atmospheric pressure. Using a gastight syringe, 250µL were transferred to a HS vial containing 100µL of Chloroform headspace as described above. The blank, calibrators, and case sample were submitted for analysis and a calibration curve was created from the area response of the DCM peak relative to that of the Chloroform ISTD.

Preliminary data showed linearity with R^2=0.9999. Unfortunately, the DCM peak area response for the case sample was lower than that of the lowest calibrator. In further calibrations, the addition of a 10µL DCM headspace calibrator and the removal of the highest DCM headspace calibrator (500µL) will give a better representation of lower concentration linearity to incorporate the case sample response into the lower linear range. The results from this analysis are only the first step because the peak area response is relative to the actual concentration of DCM in both the headspace of the calibration curve vials and the dive tank. A series of complex calculations must be completed to accurately measure the concentration of DCM in the headspace of each vial, and then a back calculation must be made to compensate for the total volume of pressurized air in the SCUBA tank.

Theory

Using the Antoine Equation[5] for DCM and Chloroform ISTD at a given temperature,

$$\ln(P) = A - \frac{B}{T + C}$$

A, *B*, and *C* are coefficients specific to each volatile compound(5)

P = Pressure (kPa)

T = Temperature (°C)

P can be calculated and used to solve for n in the Ideal Gas Law Equation.

$$PV = nR$$

P = Pressure of gas (kPa)

V = Volume (L)T

n = # of mols

T = Temperature (K)

R = 8.314 L·kPa·mol-1·K-1

Using the published coefficient values (Table 2), the number of mols of DCM in the 19mL available headspace in the vial was calculated to be 4.065x10-4 at 22.5°C, giving a concentration of 1.817 µg/µL. From this, the concentration of DCM in each of the HS vials with their respective volumes of HS gas introduced (10, 50, 100, 250µL) was calculated (Table 3).

Additional testing will be performed to estimate the total

Drowning? *(Continued)*

amount of DCM in the SCUBA tank based on the tank volume, the volume of compressed gas normally contained in this size SCUBA tank, and the concentration of DCM determined in the gas sample. Due to the complexity of these calculations, any feedback and/or assistance in this proposed methodology would be greatly appreciated.

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Figure 1

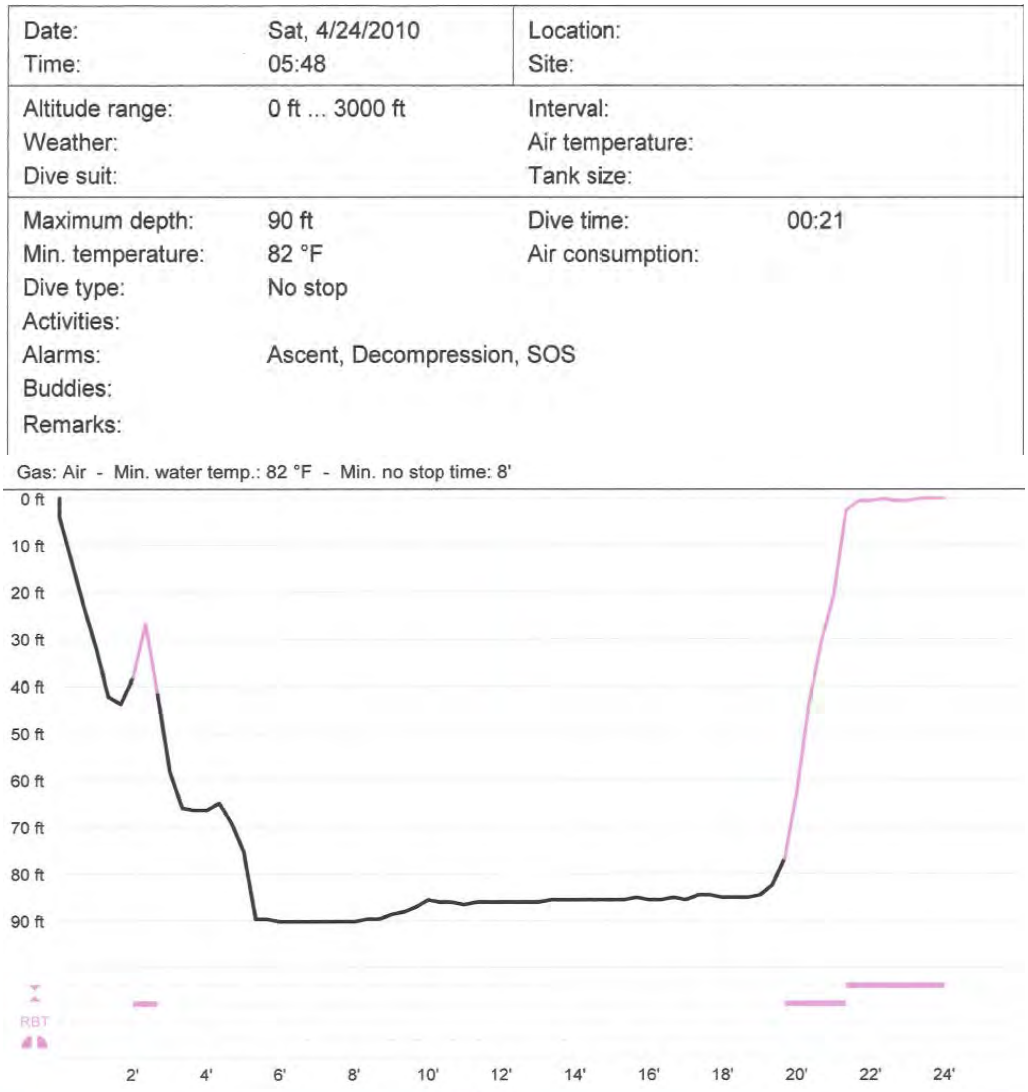


Table 1

Drug	Detected?	Instrumentation	Concentration	Matrix
Ethanol	Yes	GC-FID (Quant)	0.02%	Blood
Chlorpheniramine	Yes	GC-NPD & GC/MS (Screen)	---	Liver Homogenate
Dextrorphan	Yes	GC-NPD & GC/MS (Screen)	---	Liver Homogenate
Diphenhydramine	Yes	GC-NPD & GC/MS (Screen)	---	Liver Homogenate
Fluconazole	Yes	GC-NPD & GC/MS (Screen)	---	Liver Homogenate
Codeine	Yes	GC/MS/MS (Quant)	0.006mg/L	Blood
Carbon Monoxide	No	Co-Oximeter (Quant)	ND	Blood
Dichloromethane	Yes	SPME-GC/MS (Screen)	---	Blood

Drowning? *(Continued)*

Figure 2

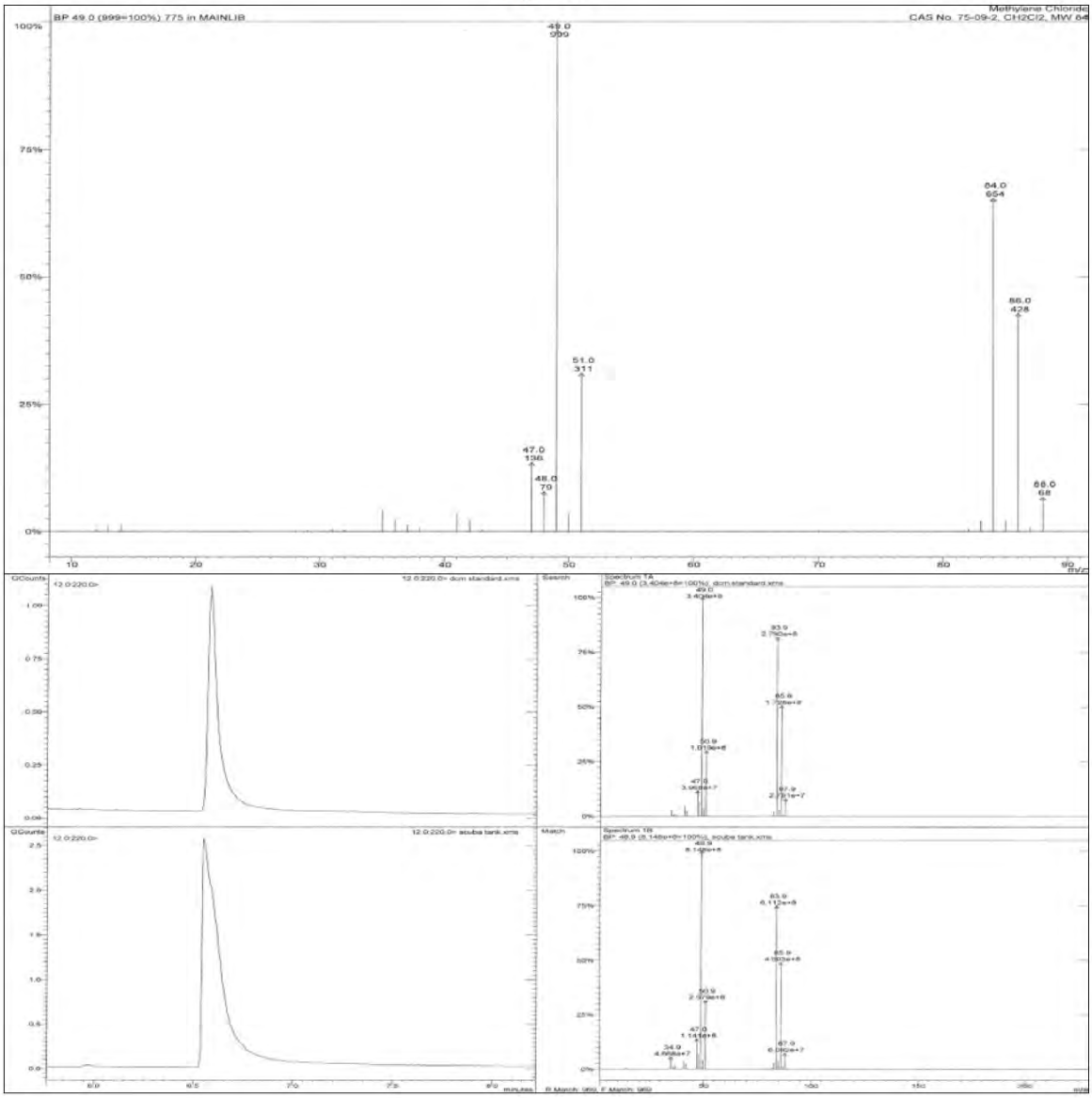


Table 2[5]

	A	B	C
DCM	13.9891	2463.93	223.240
Chloroform	13.7324	2548.74	218.552

Table 3

	10µL DCM HS	50µL DCM HS	100µL DCM HS	250µL DCM HS	100µL Chloroform HS (ISTD)
Mass DCM Transferred	18.17µg	90.85µg	181.7µg	454.3µg	114.4µg
Concentration Analyzed	0.9085µg/mL	4.543µg/mL	9.085µg/mL	22.71µg/mL	5.718µg/mL

NEW DRUGS AND TECHNOLOGY TIDBITS

Send interesting ***"New Drugs and Tech-IN Tidbit"*** articles to

Section Editor **Dan Anderson, M.S., FTS-ABFT, D-ABC**

DAnderson@coroner.lacounty.gov

Improving Agilent GC/MS Chromatographic Quality: Increased Scans/Analyte with RTL

Submitted by **Szbolcs Sofalvi, MSChE, ssofalvi@cuyahogacounty.us**

Cuyahoga County Regional Forensic Science Laboratory & Medical Examiner's Office

11001 Cedar Avenue, Cleveland, OH 44106

If your laboratory uses Agilent GC/MS instruments, an improvement in chromatographic results using selective ion monitoring (SIM) can be achieved by capturing analyte specific ion Groups in designated windows. By minimizing the number of ions in Groups, the instrument will have more time to collect data for specific analytes; as a result there is an improvement in peak shape (see below).

Addition of more analyte specific ion masses is accomplished by instructing the ChemStation® software to "Add New Groups" on the interface (see Figures 1 and 2). On the Instrument Control page, click on the quadrapole icon which brings up the MS SIM/Scan Parameters page (Figure 1 see arrow).

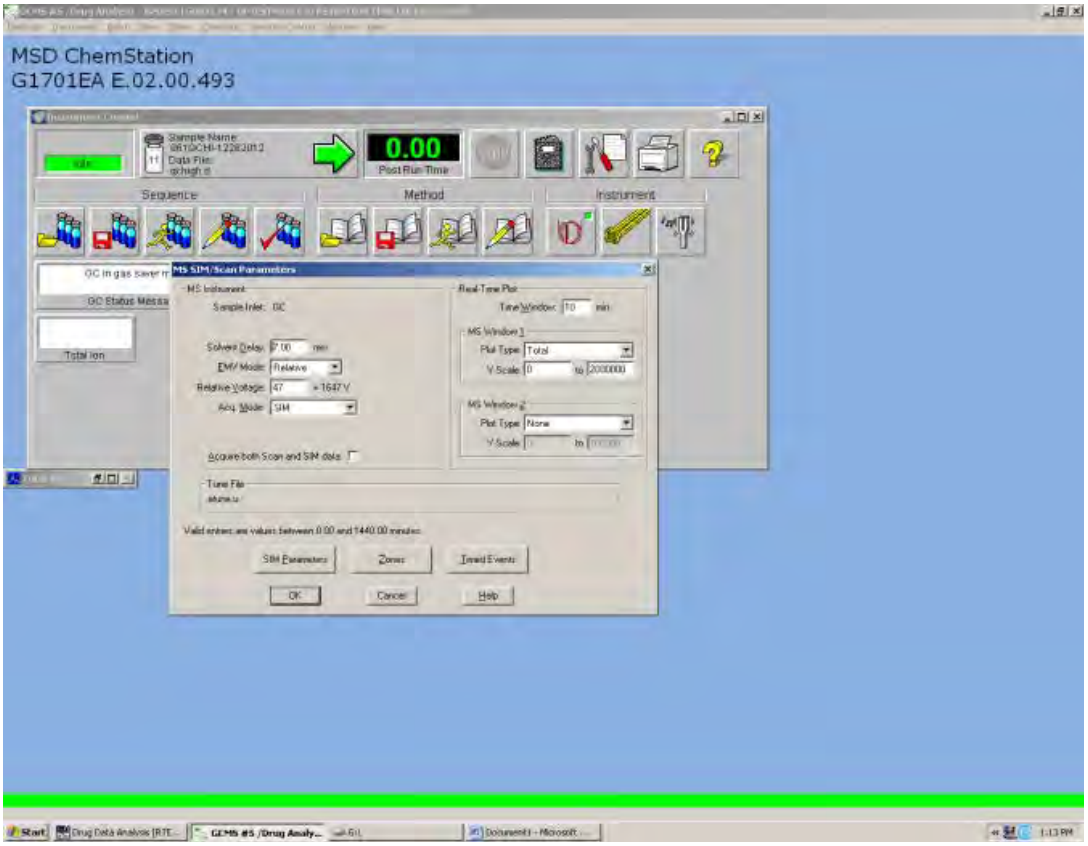


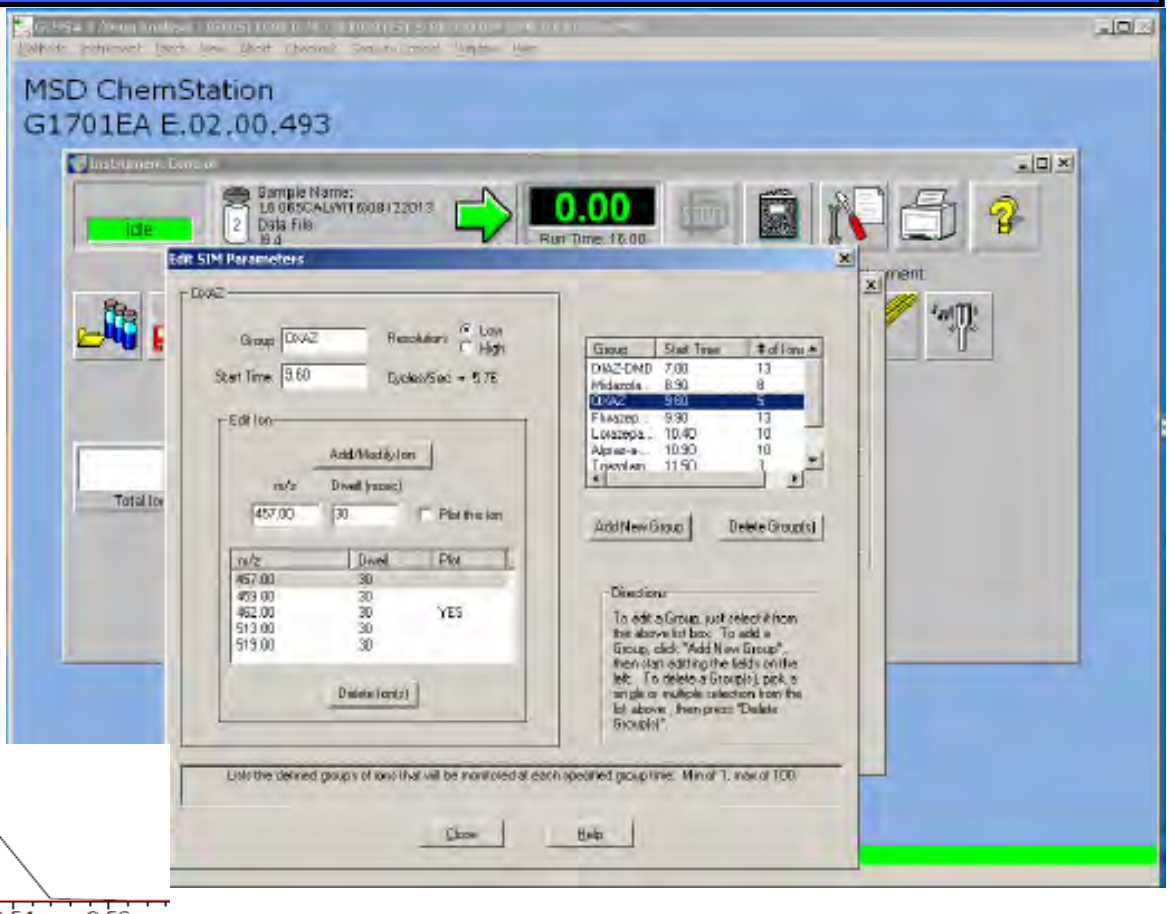
Figure 1

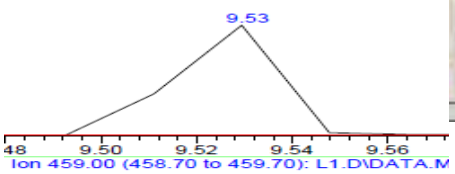
Click on the SIM Parameters to bring up Edit SIM Parameters (Figure 2). Click on "Add New Groups" to specify which analytes will be monitored in a specific Group. Click on Add/Modify Ion and proceed to enter the ions m/z to be monitored for a specific Group or analyte. In the example shown in Fig 2, the Group is Oxazepam, with a retention time at 9.60 min and there are five m/z (457, 459, 462, 513, and 519).

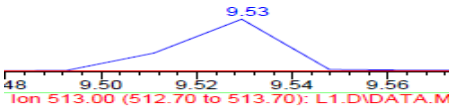
In our benzodiazepine assay, the chromatographic peak shapes were greatly improved when the ions monitored were divided into 8 Groups, as compared to 3 Groups (See Figures 3 and 4 for a comparison of Oxazepam peak shape). Grouping chromatograms with 8 Groups versus 3 Groups are shown on Figures 5 and 6. Fewer ions/Group means more scans/peak which improves peak shape (Figure 4); i.e., less fronting and tailing and better accuracy and precision. For an in depth discussion, see Agilent Technical Notes [1-3].

Improving Agilent GC/MS Chromatographic Quality: Increased Scans/Analyte with RTL *(Continued)*

Figure 2







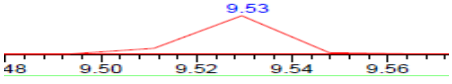


Fig. 3 Oxazepam (10 ng/mL) in Group 2 has 28 ions on Fig. 6

Calculating Scan #:

Collecting less than five data points is not even sufficient for qualitative work, whereas quantitative reporting requires ten data points (scans) on a peak according to Agilent [4]. The difference in scan number for 28 ions (4.3) versus 5 ions (24) is shown using the equations below:

Approximate PW_{base} (peak width) = 0.060 min

PW_{base}=0.060 min/1 (60 sec/min)(1000 ms)/sec) = 3600 ms

Time spent to collect 1 ion = (3600 ms)/(28 ions)=129 ms

Scans = (129 ms)/(Dwell Time)
=(129 ms)/(30 ms)=4.3

Improving Agilent GC/MS Chromatographic Quality: Increased Scans/Analyte with RTL *(Continued)*

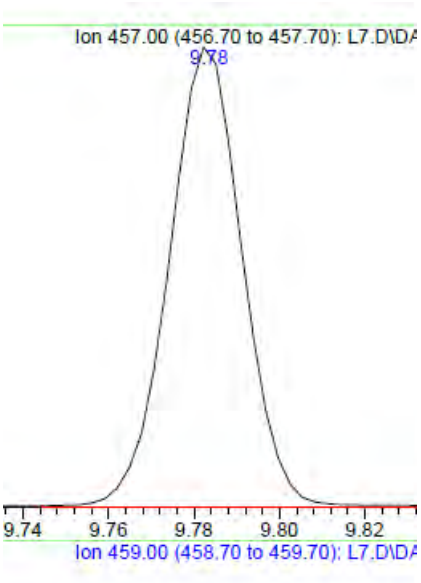
Approximate PW_{base} (peak width) = 0.060 min

PW_{base}=0.060 min/1 (60 sec/min)(1000 ms)/sec) = 720 ms

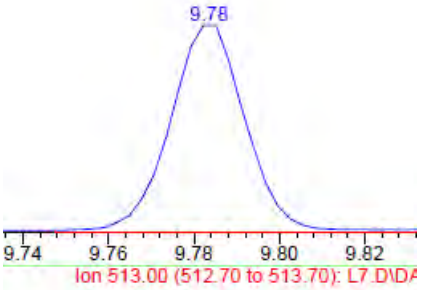
Time spent to collect 1 ion = (3600 ms)/(5 ions)=129 ms

Scans = (720 ms)/(Dwell Time)
=(720 ms)/(30 ms)=24

Collecting over seventeen data points results in excellent chromatographic quality (e.g., minimizing tailing factor, improved resolution, etc.), provides better ion ratios which reduces the number of manual integrations necessary to fix a possible ion ratio failure, and goes beyond the minimum scan # requirement (10) of the manufacturer for quantitation [4].



Use of Retention Time Locking:
The down side to improving peak shape by increasing the number of ion Groups is that when chromatographic conditions change (e.g., shortening column length or replacing the column) then retention time values have to be re-configured for each Group. This is a time-consuming process and not practical during a busy lab schedule. Because this is a significant chore, the analyst may choose to use fewer Groups with more ions, and a resultant loss of chromatographic quality. The good news is that by using Retention Time Locking (RTL), the retention times for specific analytes will remain unchanged, even though chromatographic conditions have changed (e.g., clipping column). By offsetting the column inlet pressure, RTL allows for retention times to remain essentially unchanged. As is shown in Figure 5, with RTL in place, clipping 4 ft from a column changed the inlet pressure from 16.0 to 12.7 psi which allowed for retention times for all benzodiazepines analyzed to remain practically constant.



The details of how to apply RTL can be found at reference 5.

We appreciate the assistance of Dr. Dan Isenschmid in bringing this "Tidbit" to our attention.

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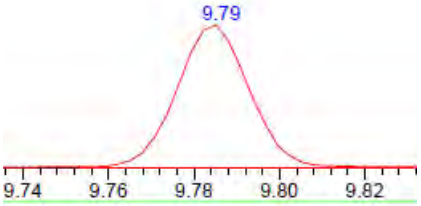

Fig. 4 Oxazepam (10 ng/mL) in Group 3 has 5 ions on Fig. 5

Improving Agilent GC/MS Chromatographic Quality: Increased Scans/Analyte with RTL *(Continued)*

2. Chin-Kai Meng (2005) *Improving Productivity with Synchronous SIM/Scan*, Technical Note Publication Part Number: 5989-3108EN ; Available at http://www.chem.agilent.com/Library/technicaloverviews/Public/5989-3108EN.pdf last accessed October 31, 2013.

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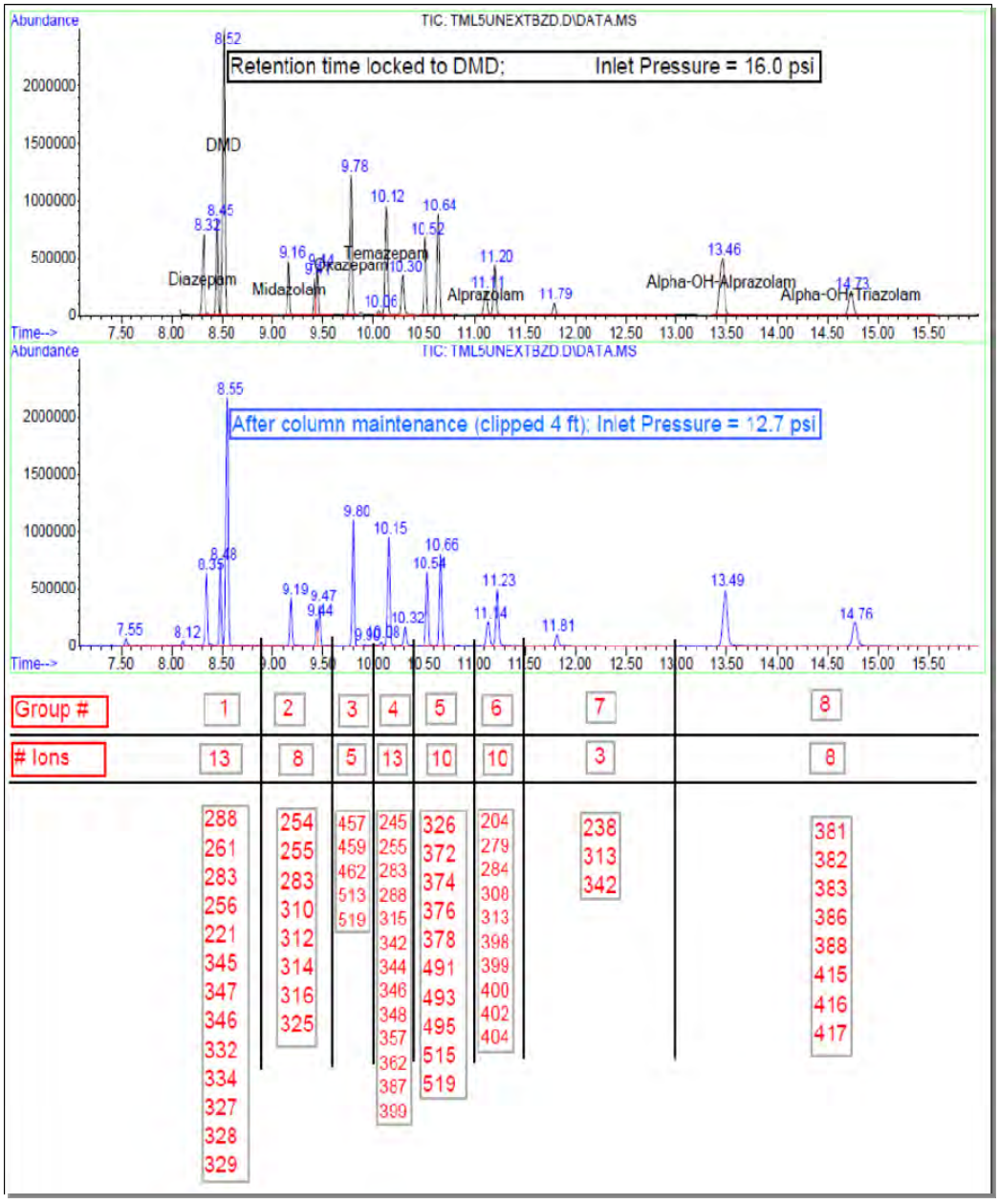

Fig. 5 RTLock Applied to Benzodiazepine (MTBSTFA) Analysis in Eight Groups

Improving Agilent GC/MS Chromatographic Quality: Increased Scans/Analyte with RTL *(Continued)*

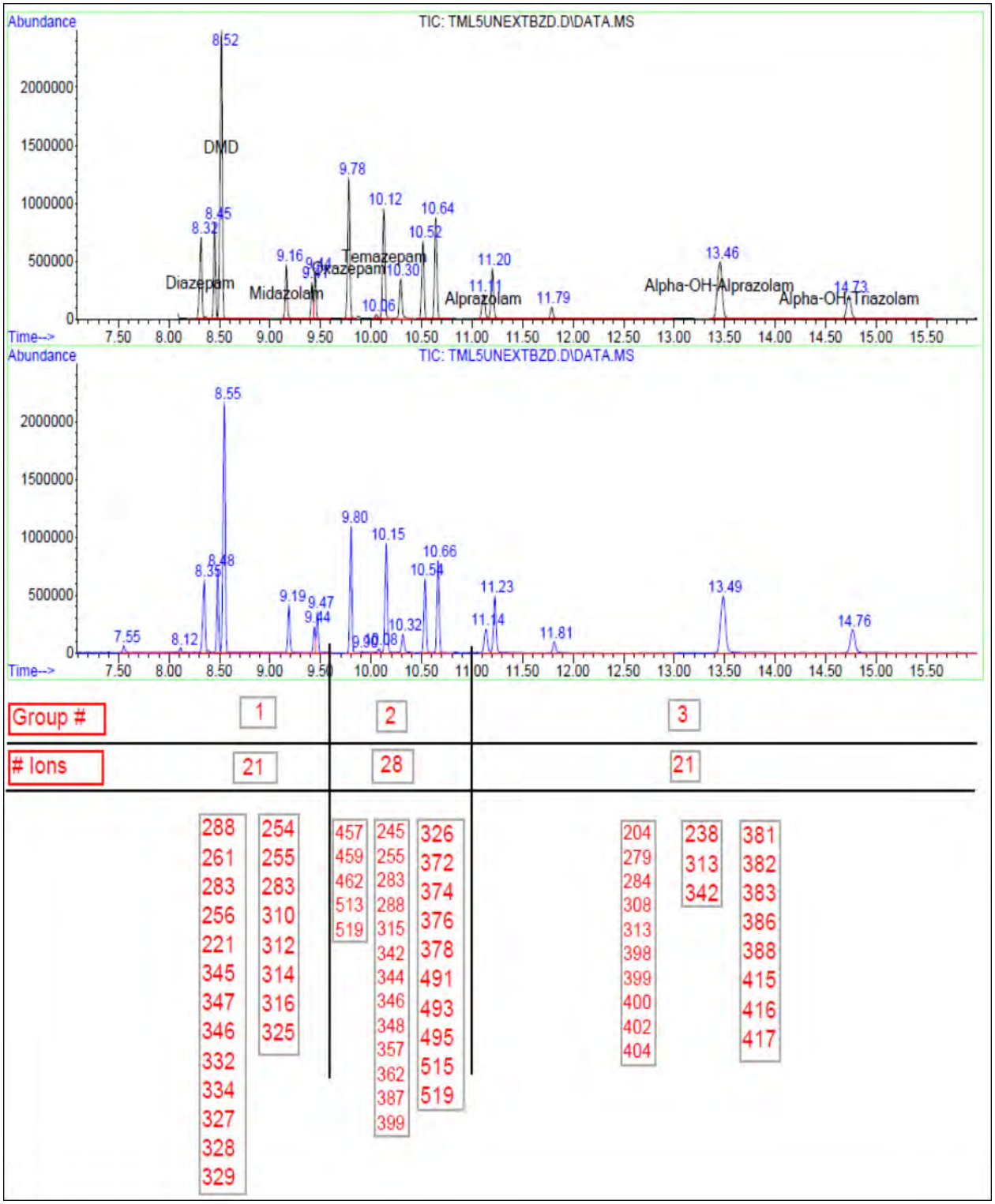

Fig. 6 Benzodiazepine (MTBSTFA) Analysis in Three Groups

FROM THE TOXICOLOGY LITERATURE

Submitted by ***Barry Levine, Ph.D., DABFT***

Toxicology Laboratory, Armed Forces Medical Examiner System

Forensic Science International Vol 231 Sep 2013

McIntyre et al reported 10 postmortem cases where hydroxyzine was detected. In 5 of the cases, the peripheral blood concentration was between 0.07 and 0.24 mg/L. Hydroxyzine was considered to be an incidental finding in these cases. In the other 5 cases, the peripheral blood hydroxyzine concentration was between 1.3 and 3.0 mg/L; these cases were judged to be potential hydroxyzine intoxication cases. The mean central to peripheral blood ratio was 0.92 ± 0.25 (n=6). The average liver to peripheral blood concentration ratio was 13.8 ± 6.2, suggesting the potential for postmortem redistribution of the drug.

Arndt et al used LC-tandem mass spectrometry to measure ethyl glucuronide (EtG) in 11 hair treatments from 8 manufacturers. EtG concentrations ranged from 0.07 to 1.06 mg/L. The presence of EtG in these hair treatments raised the possibility of external contamination of hair with EtG if these treatments had been used.

Journal of Forensic Sciences Vol 58, July 2013

Pressman and Caudill reviewed 26 articles on alcohol blackout to determine whether it meets Frye or Daubert standards of evidence as a defense in criminal cases. This included: 10 experimental studies of alcohol administration to known alcoholics; 2 studies where blackouts were to be induced with mild or moderate levels of intoxication; 10 studies where subjects had a history of blackouts by medical or criminal history; and 4 studies of self-reported blackouts in college-age students. They concluded that there is no objective method to confirm the presence of a blackout. In addition, only short-term memory is impaired and other cognitive functions such as planning and attention are not impaired.

Varlet et al proposed the measurement of carbon monoxide (CO) by head space gas chromatography-mass spectrometry as an alternative to measuring carboxyhemoglobin (COHb) by spectrophotometry. They measured CO and COHb in blood specimens from 15 living individuals and 25 postmortem cases to establish a cutoff for normal and abnormal CO concentrations. Their data suggested normal cutoffs of 1 µmol/mL for living individuals and 1.5 µmol/mL for postmortem cases. CO concentrations greater than 3 µmol/mL in postmortem cases were associated with clear CO poisoning.

Journal of Analytical Toxicology Vol 37 June 2013

Cone et al examined the metabolism and excretion patterns of oxycodone, oxymorphone, noroxycodone and noroxymorphone following administration of a single 20 mg dose of sustained release oxycodone to 12 individuals. The maximum urine concentration of hydrolyzed oxycodone ranged from 277 to 10,751 ng/mL; the maximum concentration of hydrolyzed oxymorphone ranged from 46.2 to 5743 ng/mL. Oxycodone appeared in the first collection period (0-2 hr. post dose). Noroxycodone also appeared in this first collection period at similar concentrations to oxycodone. In subsequent urine collections, the noroxycodone concentration exceeded the oxycodone concentration. Noroxycodne and oxymorphone were detectable for a longer period than oxycodone. Oxycodone and noroxycodone were excreted as free products while oxymorphone appeared primarily as a conjugated product.

Journal of Analytical Toxicology Vol 37 July-August 2013

McIntyre et al reported 3 cases involving methamphetamine where both antemortem and postmortem specimens were available for analysis. The peripheral postmortem blood to antemortem blood methamphetamine concentration ratio was 1.51 ± 0.049 mg/L for the 3 cases. In 2 of these cases, amphetamine was also present; the peripheral postmortem blood to antemortem blood amphetamine concentration ratio was 1.50. These data indicate that postmortem redistribution of methamphetamine and amphetamine occurs.

Journal of Forensic Sciences Vol 58 Sep 2013

Martin et al published a review of the literature on the impairing effects of alcohol as it pertains to driving. Included in the review were laboratory studies, driving studies, both on a closed course or on the road, epidemiological studies and individual variables such as age, sex and tolerance. As expected they concluded that as the blood alcohol concentration rises, the magnitude of impairment also increases. Whether or not impairment is observable depends on the complexity of the task.

Journal of Forensic and Legal Medicine Vol 20, May 2013

Chandrakanth et al looked at postmortem vitreous humor electrolyte concentrations in 114 cases where the exact time of death and postmortem interval were known. No statistically significant differences were found in electrolyte concentrations between eyes, between males and females and between age groups. Although sodium and chloride concentrations decreased slightly and potassium concentrations increased slightly with increasing postmortem interval, there was no correlation between these concentrations and postmortem interval.

The Young Forensic Toxicologists Committee

Submitted by **Jayne Thatcher, Ph.D.**

The Young Forensic Toxicologists (YFT) Committee would like to thank all who participated in the YFT events at the SOFT 2013 Annual Meeting in Orlando.

The week started with the YFT Symposium which was attended by more than sixty young scientists. Following a social hour, the formal program began with a welcome from SOFT President, Dan Anderson. Next, the 2012 YFT/ Leo Dal Cortivo Poster and Oral Presentation Award winners, Claire Kaspar and Brian Waters, provided an update on their research. The evening concluded with Garett M. Berman (Attorney/ Florida Traffic Safety Resource Prosecutor) and Matthew J. Olszewski (Florida DUI Group Law Firm) joining committee member Sarah Urfer to lead an interesting discussion on the effect that new marijuana legislation may have on toxicology casework.

On Monday the committee hosted a half-day workshop titled "Identifying and Publishing Quality Research for the Bench Level Scientist." The committee would like to thank Jeri Ropero-Miller, Jeff Teitelbaum, Laureen Marinetti, Elizabeth Kiely, and Ed Cone for assisting and presenting at the workshop.

On Tuesday approximately twenty college students from across the country attended the SOFT Student Enrichment Program (SSEP). The committee would like to thank Bruce Goldberger, Dan Anderson, Kevin Shanks, Dennis Siewert, Katie Miller, Ann Marie Gordon, Sabra Botch-Jones, Kara Allen, and Julia Pearson for sharing their knowledge and experiences in Forensic Toxicology with the attendees. The students were enthusiastic and eager to learn more about our field and their questions led to some great discussions.

The committee hosted its first Professional Development Fair on Tuesday evening. The goal of this event was to provide an opportunity for attendees to meet with representatives of organizations to learn more about academic programs, board certification, continuing education, and new career opportunities. The event was open to all meeting attendees. The committee thanks all of the organizations and individuals who participated in this new event. We have begun the process of planning and promoting the Professional Development Fair for the 2014 SOFT meeting and hope many of you will participate in this event.

The final event hosted this year by the committee was the SOFT YFT/ Leo Dal Cortivo Poster and Oral Presentation Award Competition which included a prize of $1000 and a free registration at a future SOFT meeting. Approximately sixty eligible participants submitted an abstract and indicated they wished to be considered for the award. There were many great presentations and the committee thanks all who participated. The 2013 winners were announced at the closing ceremonies and are as follows:

- Rachel Y. Barnett from Franklin County Coroner's Office for her poster titled "What's Up, DOC?-A Case Report."
- Nichole Bynum from RTI International for her presentation titled "The Evaluation of Laser Diode Thermal Desorption (LDTD) for High Throughput Analysis in Forensic Science"

The YFT Committee aims to encourage young forensic toxicologists to join SOFT and actively participate in annual meetings; facilitate networking opportunities among young forensic toxicologists, particularly among first time meeting attendees; and promote training and educational opportunities for young forensic toxicologists. Please help us spread the word about our committee and encourage any eligible scientists that may be interested in our events to participate. They can learn more about us at our link on the SOFT website or by contacting us directly at **softyft@gmail.com.**

We will be planning another educational and fun YFT program for the SOFT 2014 Annual Meeting in Grand Rapids and hope many of you will participate in our events.

SOFT/AAFS Drugs and Driving Scientific Session, SOFT 2013, ToxTalk Summaries:

Submitted by **Curt Harper**

Alprazolam – Alabama's Most Prevalent Drug in DUID Cases

Curt E. Harper, Justin Sanders, and Kristen Ellis, Alabama Department of Forensic Sciences.*

Historically, marijuana has been the most prevalent drug in DUI/D cases in Alabama and remains the most prevalent drug in many states. For the first time, alprazolam (prevalence rate = 21%, median conc. = 74 ng/mL) has surpassed marijuana as the most frequently encountered drug (excluding ethanol) in driving cases. 95% of alprazolam-positive cases were Caucasian. It is not surprising to see alprazolam and hydrocodone in combination since benzodiazepines are often taken by pain patients to improve sleep, relax musculature, and relieve anxiety that may be attributed to the sensation of pain. 78% of cases involved polydrug use and hydrocodone was the most common additional drug found (37%). An emphasis should be placed on public awareness and education of law enforcement and the judicial system regarding the increase in alprazolam use among drivers.

Quantitation of Ethanol and Identification of Other Volatiles by Headspace Gas Chromatography with Simultaneous Flame Ionization and Mass Spectrometric Detection.

Dustin Tate Yeatman, MS, Nicholas B. Tiscione, MS, Ilene Alford, MS, Xiaoqin Shan, PhD, Palm Beach County Sheriff's Office, Joe Kahl, BS, Miami-Dade Medical Examiner Department.*

Ethanol is the most frequently identified compound in forensic toxicology. Although confirmation involving mass spectrometry is desirable, relatively few methods have been published to date. Other volatiles commonly abused as inhalants are identified by non-specific methods or confirmed separately using mass spectrometry. This study describes development and validation of a novel technique that utilizes a capillary flow technology (CFT) splitter to simultaneously quantitate and confirm ethyl alcohol and identify inhalants by flame-ionization (FID) and mass spectrometric (MS) detection following headspace sampling and gas chromatographic separation.

Case Management in a DUI Lab: Effect on Drugs Reported.

Nicholas B. Tiscione, MS, Xiaoqin Shan, PhD, Dustin Tate Yeatman, MS, Palm Beach County Sheriff's Office.*

This study evaluates the decision to implement a protocol for limiting drug testing based on ethanol concentration. This case management strategy is supported by the known impairment of ethanol at higher concentrations, difficulty assigning a level of contributing impairment from drugs in the presence of high ethanol levels, and the likelihood that the drug results may be suppressed at trial. Although the results of this study support the assertion that such protocols lead to under reporting drugs in DUI cases, these results definitively demonstrate that for the majority of cases, 95% in our study, the drugs detected are not significant and do not warrant the significant increase in testing required with blood drug screens (BDS). Furthermore, our study indicates that a high drug positivity rate, 58% of those cases that would not have originally received a BDS in our study, does not necessarily mean that those drug results are meaningful. More research should be conducted with quantitative drug results and casework impact of BDS protocols before recomending that all DUI labs abandon them, as current studies only discuss drug positivity rates and not whether the drug results would be meaningful to the case.

Arizona DUID and Cannabis: Three Case Reports Covering Observed Driving Behaviors, Some D.R.E. Evaluations and Toxicological Results in Arizona Drivers.

*Chester Flaxmayer, Forensic Alcohol Science & Technology (FAST), Scottsdale, AZ***.**

An Admin Per Se statute enables law enforcement to detain, arrest, examine, and draw blood from drivers stopped for suspicion of driving under the influence of drugs in Arizona. These cases show some of the issues that arise from such a law and the types of driving behavior, field and DRE performance, and blood concentrations of THC or its metabolite found in the blood of Arizona drivers.

On Human Ethanol Pharmacokinetics: Time to Maximum Concentration and the Elimination Phase; Categorization of Profiles

Michael R. Corbett and Kelsie Burnley, University of Ontario Institute of Technology, Mississauga, ON, Canada

Michael Corbett presented on ethanol pharmacokinetics from his breath alcohol testing of people for court purposes in Canada. By two hours, all subjects (n=796) reached their maximum alcohol concentration (median: 23 minutes) and 99.2% were in their elimination phase (median: 25 minutes). Pharmacokinetic profiles were categorized: 65.6% were in a linear elimination phase by the first measurement after drinking, and 14.2% had a plateau component. The study contributes scientific

SOFT/AAFS Drugs and Driving Scientific Session *(Continued)*

support for a two-hour presumption used in some jurisdictions in the United States for applying a post-incident alcohol test result to a recent prior incident.

Recommendations for Toxicological Investigation of Drug Impaired Driving and Motor Vehicle Fatalities

Barry K. Logan, Kayla J. Lowrie, Jennifer L. Turri and Jillian Yeakel, Center for Forensic Science Research and Education, Frederic Rieders Family Renaissance Foundation, Willow Grove, PA, USA, Jennifer F. Limoges, New York State Police Forensic Investigation Center, Albany, NY, USA, Amy Miles, Wisconsin State Laboratory of Hygiene, Madison, WI, USA Colleen Scarneo, Department of Safety-Division of State Police, Concord, NH, USA, Sarah Kerrigan, Sam Houston State University, Huntsville, TX, Laurel Farrell, Toxicologist/Consultant, Longmont, CO, USA*

Drug impaired driving is a significant traffic safety problem in the United States and around the world. Forensic toxicology laboratories involved in this type of casework have a wide variety of capabilities and resources, and operate under varying local policies, resulting in large differences in the scope of testing performed. The presentation discussed a series of consensus recommendations intended to provide forensic toxicology laboratories with guidelines for a minimum standard for the analysis of drug impaired driving casework. A demographic, analytical capabilities and current resources survey of 96 laboratories performing DUID testing gave rise to a two tiered approach for the recommendations for testing. Tier 1 compounds represent the most prevalent drugs which are capable of being detected with available commercial immunoassays and standard cut-off concentrations and confirmed using gas or liquid chromatographic instrumentation. Tier 2 are drugs recognized to be relevant to impaired driving investigations but may be less frequently encountered, only of regional significance, and/or beyond the routine capability of many laboratories. The goal is provide a framework in which DUID casework may be standardized and to encourage laboratories to adopt this standard approach.

Designer Drugs Committee Update

Submitted by **Sumandeep Rana, M.S.,** *Committee Chair*

At the most recent SOFT Meeting in Orlando, the Designer Drugs Committee (DDC) organized a half day workshop entitled "Pharmacology and Toxicology of Synthetic Cannabinoids." With over 200 participants, this was the most attended workshop at SOFT 2013. Much important information was conveyed at the workshop including the high binding affinity of these compounds to both CB1 and CB2 receptors, the activity of the compounds and prominent metabolites, and the wide range of serious clinical effects that synthetic cannabinoids cause in users. Dr. Robert Kronstrand provided an overview of the in vitro and in vivo toxicity studies that have been performed on synthetic cannabinoids. Of particular note was the presentation by Dr. Michael Schwartz of the CDC, where he discussed many serious cases of synthetic cannabinoid toxicity including four cases of acute kidney injury in XLR-11 users. Also, Dr. Jeff Moran discussed the metabolism and toxicity studies that his group has performed including the challenging method development of chiral metabolites. Additionally, Dr. Sherri Kacinko gave many important websites where one can monitor emerging drug trends. All in all, participants left the workshop with a better appreciation of the challenges presented by this important class of emerging drugs.

DDC is also organizing a half day workshop, addressing analytical challenges associated with emerging drugs, at the upcoming Academy (AAFS) meeting to be held in Seattle from Feb 17-22. This workshop titled "Designer Drug Detection in Forensic Toxicology: From Basics to Brilliant!" will focus on the detection of two major classes of designer drugs (cathinones and cannabimimetics) in forensic toxicology investigations.

The Designer Drugs section on the SOFT website now has content in the Government Reports and Published Literature sections, and the Drug Monographs continue to expand. Over 30 government reports are available as PDF downloads, and there are several hundred citations in the Published Literature section, with each citation linking back to PubMed for access to the article abstract. This section should continue to grow at a rapid pace.

In addition, there is a Google search box located in each Designer Drugs section that will retrieve results from each specific section.

Stay tuned for the latest updates regarding DDC activities and new features of DDC web pages on SOFT web-site in the future issues.

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American College of Medical Toxicology - Reflections

Submitted by ***Paul M. Wax, MD, FACMT ,***

Executive Director, American College of Medical Toxicology

Last month at the Hilton Baltimore, the American College of Medical Toxicology (ACMT) was pleased to offer its fifth 2-day course in its series: "*Seminars in Forensic Toxicology*." First started in 2009, these courses have teamed forensic toxicologists with medical (clinical) toxicologists as faculty, and have provided in-depth education to both medical and forensic toxicologists who wish to develop and enhance their toxicological skills. For those involved, the best part has been the cross-disciplinary networking and collaborations between those with different training and backgrounds who all practice toxicology under one guise or another and share a love for this exciting discipline. Some of the SOFT members who have served as faculty for these courses include Robert Forney, Bruce Goldberger, Marilyn Huestis, Yale Caplan, Cynthia L. Morris-Kukoski, Barry Logan, Robert Middleberg, Michael Smith, and Marina Stajić.

ACMT was organized in 1993 as the primary organization to serve physicians who are Medical Toxicologists. Medical Toxicology is a relatively new medical subspecialty that focuses on the diagnosis, management and prevention of poisoning and other adverse health effects due to medications, drug overdose, acute drug abuse problems, chemical exposures, occupational and environmental toxins, biological agents and envenomations. Board certification for physicians in Medical Toxicology began in 1975 when a subgroup of physicians from the American College of Clinical Toxicology formed the American Board of Medical Toxicology (ABMT) who wrote and administered a credentialing examination for physicians. In 1993 the American Board of Medical Specialties (ABMS) formally recognized Medical Toxicology as a medical specialty. A group of physicians from the American Board of Emergency Medicine, American Board of Pediatrics, and American Board of Preventative Medicine now oversee the Medical Toxicology certification examination. ACMT represents the vast majority of physicians who are Board Certified in Medical Toxicology.

ACMT publishes the Journal of Medical Toxicology, its official print journal. This international, medline-indexed, peer-reviewed journal is dedicated to advancing the science and practice of medical toxicology. The journal publishes original articles, illustrative cases, review articles, and other special features. ACMT also sponsors the Forum, an online interactive moderated discussion site that enables members to rapidly exchange information, advice and comments on clinical developments, unusual or difficult cases, public policy, and job and training opportunities.

In 2010, ACMT started the Toxicology Investigators Consortium, better known as ToxIC. This multicenter research network of more than 40 major medical toxicology centers across the United States has developed a registry of patients directly treated by medical toxicologists at the bedside and is organized to conduct multi-center research. By November 2013, more than 25,000 cases had been entered into this registry. Currently the registry is entering more detailed information on selected patients in a series of subregistries that focus on prescription opioid misuse, life threatening poisonings receiving intralipid therapy, North American snakebite envenomations, and patients with metal on metal hip prostheses.

Each spring, the ACMT Annual Scientific Meeting offers state of the art lectures and symposia to toxicologists and other interested registrants on a wide range of cutting edge topics. Beginning in 2013, original research abstracts were accepted for presentation at this conference. The next conference will be March 28-30, 2014 in Phoenix Arizona at the Arizona Biltmore. The theme of this conference is TechnoTox: The Interface of Toxicology and Technology. Robert Middleberg is one of the keynote speakers. More information about this conference can be found here. A one day preconference symposium entitled: Natural Toxins Academy: Clinical Applications of Cutting Edge Research will be held on March 27, 2014. Note that ACMT's conference is occurring just after the SOT ToxExpo™ in Phoenix this year.

In addition to these live conferences, ACMT now offers several webinars each month. The core webinar is National Case Conference. a monthly discussion of novel or interesting cases in medical toxicology. Hosted by Lewis Nelson, MD, the national case conference is an interactive conference of toxicologists across the country that discusses uncommon presentations of common cases and uncommon cases. Additional webinars focused on medical specialty toxicology applications (e.g. use of MRI, hemodialysis), journal clubs, and web-based training in environmental toxicology are also available on-line.

In 2009 ACMT established the Medical Toxicology Foundation (MTF). Raising needed funds to support research, education and

American College of Medical Toxicology *(Continued)*

development in medical toxicology, the MTF has supported pilot grants and travel awards to foster innovations and mentorship. The 2013 MTF Annual Report can be found here.

ACMT welcomes the opportunity to collaborate and partner with others in the broader toxicology community. In our clinical practices, analytical questions often are referred to medical toxicologists for interpretation. Many of our medical brethren tend to believe that there is a "tox screen" that detects everything, and don't understand that a urine immunoassay for morphine may not cross react reliably with oxycodone, let alone methadone. Unlike many physicians, medical toxicology practice is not procedure-based: We don't do surgery or endoscopy or cardiac catheterizations. We do provide guidance in diagnosis and management based on toxicological principles, and we offer interpretation of laboratory data.

While initially founded for physicians who were board certified in medical toxicology, ACMT has offered a new membership category of "affiliate member" since 2012. Non-physicians who have a doctorate-level degree and have an interest in toxicology can now apply for membership in ACMT. We welcome affiliate applications and inquires. On-line educational materials are available to all members.

Please address any questions to ACMT's Executive Assistant, Tricia Steffey at tsteffey@gmail.com or by telephone at 623-533-6340.

Editor's note: ACMT membership is now available to non physicians. This may be of interest to many SOFT members.

The Consortium of Forensic Science Organizations (CFSO) Update

Submitted by ***Laurel Farrell, BA***

Movement on forensic science reform/advancement legislation is likely this session. Senator Leahy is committed to the passage of a bill. His staff has been working diligently to garner Republican support to allow movement forward in the legislative process. We have been told that the bill when reintroduced is expected to be both bipartisan (Democrat/Republican) and bicameral (Senate/House). CFSO continues to answer questions from all parties working on this legislation to ensure that the forensic science community's concerns on previous versions are considered and our suggested changes are considered.

The Society of Forensic Toxicologists and American Board of Forensic Toxicology are members of CFSO. Regular updates on CFSO activities and legislation that impacts forensic laboratories is available in CFSO newsletters at **http://www.thecfso.org/**

Drug Facilitated Sexual Assault Survey

The Society of Forensic Toxicologists (SOFT) Drug Facilitated Sexual Assault (DFSA) Committee is gathering data from laboratories that perform analyses on DFSA cases. This survey is designed to determine the most frequently encountered drugs utilized in suspected DFSA cases. By defining these drugs the committee's intent is to utilize this information to direct research and define any demographic trends in drug use that may exist.

The survey is set-up to only take a short time to complete. Respondents will receive a summary of the data.

The link: **http://www.surveymonkey.com/s/YD5H2GQ**

If you have questions about how to complete the survey or if you are not the correct person in your laboratory to complete the survey, please contact Laureen Marinetti at **marinettiL@mcohio.org**

2014 AAFS Meeting in Seattle, WA

Submitted by **Sarah Kerrigan, Ph.D.**, Section Program Chair and **Rebecca Jufer, Ph.D.,** Section Program Co-Chair

By now, many of you will have already made plans to attend the 66th Annual Scientific Meeting of the American Academy of Forensic Sciences in Seattle, WA. Meeting dates are February 17 – 24, 2014 and the deadline for pre-registration is Wednesday January 22.

There are a total of four Toxicology Section workshops this year, covering a wide range of topics including analytical strategies for detecting designer drugs in busy laboratories, forensic laboratory management, pharmacology and toxicology of novel psychoactive substances and root cause analysis.

Monday February 17, 2014

W1

8:30 a.m. - 12:00 p.m. Designer Drug Detection in Forensic Toxicology: From Basics to Brilliant!

Chair: Sarah Kerrigan, PhD; Co-Chair: Sumandeep Rana, MS

W12

1:00 p.m. - 4:30 p.m. Root Cause Analysis — When Blaming the Analyst Completely Misses the Point

Chair: Laurel J. Farrell, BA; Co-Chair: Marc A. LeBeau, PhD

Tuesday February 18, 2014

W17

8:30 a.m. - 5:00 p.m. Managing the 21st-Century Forensic Science Organizations

Chair: Jeri D. Ropero-Miller, PhD; Co-Chair: Jody M. Wolf, MS

W18

8:30 a.m. - 5:00 p.m. Novel Psychoactive Substances (NPS): Pharmacology, Toxicology, and Case Reports

Chair: Alan R. Felthous, MD; Co-Chair: Sherri L. Kacinko, PhD

Following the success of the very first Toxicology Section Luncheon last year, we will repeat this again in 2014. Last year you will remember the heartwarming personal stories told by many colleagues. We will once again celebrate the contributions of some rather special members of the section. Please remember to register for this event. It is not included in your general registration. From the 2014 Program Chairs, we encourage you to attend the meeting and look forward to seeing you in Seattle!

Message from the Host of SOFT 2013

Submitted by **Bruce Goldberger, Ph.D., DABFT**

The SOFT 2013 meeting was a huge success. The scientific program was excellent, and the numerous social events provided an opportunity for the attendees to connect with friends and colleagues. The President's Reception, followed by an evening at Cirque du Soleil® La Nouba™, was enjoyed by all.

I would like to take this opportunity to thank the members of the SOFT 2013 Committee:

Meeting Co-Host:
Chris Chronister

Scientific Program:
Michele Merves and Matt Juhascik

Workshop Coordinator:
Chris Chronister and Jeri Ropero-Miller

Treasurer:
Laurel Farrell

Exhibitor Liaison:
Jarrad Wagner

SSEP / YFT:
Jayne Thatcher

Audiovisual:
Frank Wallace

Website Coordinator:
Matt Juhascik

Volunteer Coordinator:
Theresa Hippolyte and Liz Zaney

Sunshine / Reiders Silent Auction:
Tate Yeatman

Karla Moore 5K Fun Run:
Dennis Siewert

Also, the meeting would not have been a success without the generous support provided by the Tier 1 sponsors - ABSCIEX, Agilent Technologies, Cerilliant, Immunalysis, Randox, Restek, Thermo Scientific, UTAK Laboratories and UCT.

Finally, I would like to acknowledge the hard work and effort of Bonnie Fulmer. As a devoted member of the "SOFT family", her attention to detail is critical to the success of the meeting.

See selected pictures from the meeting on page 35.

In Memorium

Rodger Lowell Foltz, Ph.D. (1934—2013)

With the passing of Rodger Lowell Foltz on September 20th, 2013, the forensic, analytical and mass spectrometry communities have lost a truly innovative and highly valued colleague.

Rodger was raised in Wisconsin, received a B.S. degree in chemistry from the Massachusetts Institute of Technology (1956) and a Ph.D. in Organic Chemistry (1961) from the University of Wisconsin. Rodger served as a key Project Leader at the Battelle Memorial Institute in Columbus Ohio for 20 years and also served as an adjunct professor at Ohio State University. In 1980, Rodger joined the University of Utah as a Research Associate Professor of Pharmacology and Toxicology and an Associate Director at the Center for Human Toxicology.

While at the University of Utah, Rodger received numerous research grants and awards from both federal and private agencies, including the National Institute on Drug Abuse, the Office of Naval Research, Hoffman LaRoche, and Pfizer, among others. His research led to the development of state-of-the-art mass spectrometry methods for analysis of a wide array of drugs and their metabolites. Rodger developed the first effective method for the analysis of THC and its metabolites in blood (1984) and for LSD and metabolites in urine (1988). These methods still serve as the foundation for analytical methods used by laboratories today. Rodger was a leader in the use of chemical ionization mass spectrometry, tandem mass spectrometry and LC-MS/MS. His research with the National Institute on Drug Abuse and National Institutes of Health has lead to an improved understanding of the effects and analysis of drugs of abuse and potential new treatment drugs. During his career, Rodger published over 140 peer-review scientific articles and contributed numerous book chapters and scholarly reviews to the analytical literature, thereby achieving both national and international recognition for his research activities. Rodger was a co-founder and technical director of Northwest Toxicology and later Tandem Laboratories. He retired as Research Professor Emeritus from the University of Utah in 2009 and moved to Keenan, New Hampshire, where he resided until his passing this year after a period of declining health.

Rodger will be fondly remembered for his many professional and personal contributions to organizations such as the American Academy of Forensic Sciences, Society of Forensic Toxicologists, California Association of Toxicologists (President, 1996-1996), American Society of Mass Spectrometry, American Association of Pharmaceutical Scientists and American Chemical Society. For many years, Rodger provided a regular analytical toxicology literature review for the California Association of Toxicologist, a valuable resource of current methods and findings from relevant scientific literature. He also served as a member of the Editorial Advisory Committee for Biological Mass Spectrometry (1979-1994). In 2000, Rodger received the prestigious Gettler Award from AAFS for his contributions to analytical and forensic toxicology. Also, Roger steadfastly served as a mentor and example to his colleagues, visiting scientists and many students.

Rodger will also be remembered by his friends and family for his enthusiasm for life and adventure. He enjoyed photography, world-travel, backpacking, hiking and excelled in downhill skiing, golf, and tennis. He was often the catalyst for group activities in these areas, stimulating a life-long appreciation of these activities in colleagues, staff, and students. Rodger is survived by Ruth Foltz, his wife of 57 years; a son, Dr. Richard Foltz and family of Montreal Canada; and a daughter, Camilla Foltz Brandt and family of London, UK.


SKULL
SPEAKER

Society of Forensic Toxicologists, Inc.

WORKSHOP PROPOSAL

2014 SOFT Annual Meeting

Grand Rapids, Michigan

Proposals are due March 14, 2014

INSTRUCTIONS:

- Complete the workshop proposal form in its entirety.
- Submit the workshop proposal form electronically to the Workshop Coordinators (denice.teem@nmslabs.com and erin.spargo@dallascounty.org) no later than **March 14, 2014.**
- The deadline for submission of workshop materials (agenda, ppt pages, faculty biographies, cover pages, disclosure forms, speaker notes, etc.) is **September 1, 2014**.
- All speakers must provide speaker notes.
- The Workshop Chairs are responsible for reviewing and properly formatting all materials to the workshop coordinators prior to the final submission deadline.
- On the day of the workshop, workshop chairs are expected to arrive at least 30 minutes prior to the start of the workshop.

WORKSHOP TITLE:

(Note - The title of the workshop must accurately indicate workshop content and learning objectives.)

Workshop Chair Name (middle initial and degree required):

Title & Affiliation (required):

Address:

Phone: Fax: E-mail address:

Workshop Co-Chair Name (Required) (middle initial and degree required):

Title & Affiliation (required):

Address:

Phone: Fax: E-mail address:

Abstract: (Provide a brief summary of the workshop.)

Learning Objectives: (Provide at least 3)

1.

2.

3.

Instructors: (Note-Each individual speaker is required to fill out a separate disclosure form.)

Speaker Name:

Title & Affiliation (required):

Speaker Name:

Title & Affiliation (required):

Speaker Name:

Title & Affiliation (required):

Audience knowledge level required: ☐ Basic ☐ Intermediate ☐ Advanced

Has this workshop been presented at SOFT or any other meeting before? ☐ Yes ☐ No

If "Yes," when:

Scheduling:

Preferred Workshop Length: ☐ ½ day ☐ Full day

Preferred Workshop Day: ☐ Monday ☐ Tuesday ☐ no preference

For ½ day workshop – preferred time slot: ☐ morning ☐ afternoon ☐ no preference

Please indicate any specific scheduling conflicts for chairs and/or speakers (i.e., board meeting)

WORKSHOP SCHEDULE

Provide a schedule for each workshop topic. Include topic, instructor, and beginning and ending time for each. Remember to include the 30 minute break, starting 2 hours after the start time. For ½ day workshops, use the morning times for your proposed schedule (even if you requested an afternoon session). For full day workshops, plan for a lunch break from 12:00 pm -1:30 pm. If alternate times are requested, please provide a justification.

Example: Half-day Workshop

TITLE:	**The Toxicology of Animation**
8:00 – 8:15 am	**Welcome & Introduction** Dr. Rocket J. Squirrel
8:15 – 9:00 am	**Recognition of Potential Poisonings** Bullwinkle Moose
9:00 – 10:00 am	**Alterations in Human History** Mr. Peabody

10:00 – 10:30 am Coffee Break

10:30 – 11:15 am Dispensing and Administering of Potential Poisons
Bart Simpson

11:15 – 12:00 pm Obtaining Primary and Alternate Poisons
Dr. Wile E. Coyote

12:00 noon Lunch Break

KEY TERMS:

Provide three key terms to be used to reference your workshop in the key word index of the *Proceedings.*

1.
2.
3.

WORKSHOP LOGISTICS:

Preferred audience size:

Does the number in attendance need to be restricted? ☐ Yes ☐ No

If Yes, maximum attendee number

Format: ☐ Lecture ☐ Demonstration ☐ Hands-On ☐ Roundtable Discussion ☐ Other

If Other, please describe:

Preferred room set-up: ☐ Classroom ☐ Theater ☐ Roundtable ☐ Other

If Other, please describe:

NOTE: If other than a standard set-up, attach a diagram.

Is a head table required? ☐ Yes ☐ No If Yes, for how many people?

Is a lectern required? ☐ Yes ☐ No If Yes, how may are needed?

Audio-visual and Other Special Requirements: (Presentations will be *preloaded* on computers for use.)

Laptops, LCD projectors, screens, laser pointers, and microphones will be available. Please indicate any other potential requirements:

☐ 35mm projector(s) > Number:
☐ VCR/TV Monitor
☐ Other (describe flip charts, chalk board, tables for demonstration, etc.):

Is faculty travel for Non-SOFT members requested (funding is limited and requires justification)**?** ☐ Yes ☐ No If Yes, provide detail (number of people, travel from location)?

HANDOUTS:

NEW THIS YEAR: Handouts will be printed 2 slides per page, front and back (instead of 3 per page with writing lines on the right.)

Provide an estimate of the number of original handout pages: _____

Handouts are REQUIRED for all workshops and from ALL presenters. The required format for presentation material is two slides per page with notes. Include anticipated additional speaker materials in the estimate (i.e. articles).

Materials must be submitted electronically to the meeting Workshop Chair in advance to facilitate processing, copying, and shipping of materials. The deadline for final materials is tentatively scheduled for **September 1, 2014**. It is the individual workshop chairs' responsibility to review and properly format all submitted materials prior to the final submission deadline.

As Workshop Chair and Co-Chair, we acknowledge that it is ultimately our responsibility to meet all deadlines associated with this workshop. Failure to turn in all materials by stated deadlines could result in cancellation of the workshop or SOFT declining your request to chair a future workshop.

Chair Signature and Date: _____

Co-Chair Signature and Date: _____

(If electronic signatures are not available, indicate your acknowledgement of this responsibility in the submission e-mail.)

Society of Forensic Toxicologists, Inc.

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Ben Kuslikis
Mike Smith

Scientific Program Chairs
Laureen Marinetti, Michelle Glinn

Workshop Chairs
Erin Spargo, Denice Teem

Treasurer
Marc LeBeau

Vendor Liaison
Jarrad Wagner

Social Chairs
Denice Teem and Kim Daily

YFT/SSEP Coordinator
Jayne Thatcher

Volunteer Coordinator
Prentiss Jones

SOFT 2014 Website Liaison
Russell Lewis

Silent Auction Coordinator
Elizabeth Kiely

Fun Run
Vincent Papa

2013 S.O.F.T. Committee Chairs

Committee	Committee Chair
Advocacy	Bruce Goldberger, Ph.D., DABFT
ByLaws	Yale Caplan, Ph.D., DABFT
Budget, Finance, and Audit	Rod McCucheon, Ph.D., DABFT
Membership	Ruth Winecker, Ph.D., DABFT
TOXTALK® Editor	Yale Caplan, Ph.D., DABFT
Publications	Dimitri Gerostamoulos, Ph.D., DABFT
JAT Special Issue	Madeline Montgomery B.S., FTS-ABFT
Awards	Erin Spargo, Ph.D., DABFT
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Designer Drugs	Sumandeep Rana, M.S.
Policy and Procedure	Ruth Winecker, Ph.D., DABFT
IT Committee	Bruce Goldberger, Ph.D., DABFT
Continuing Education	Ann Marie Gordon, M.S.
Young Forensic Toxicologists	Jayne Thatcher, Ph.D.
Drug Facilitated Sexual Assault	Laureen Marinetti, Ph.D., DABFT
Ethics	Robert Osiewicz, Ph.D., DABFT
Nominating	Marc LeBeau, Ph.D., DABFT
Strategic Planning	Jennifer Limoges, M.S., DABC
Consortium of For. Science Organizations	Laurel Farrell, B.A.
Vendor Liaison	Jarrad Wagner, Ph.D.

Webmasters

Bruce Goldberger, Ph.D., DABFT
Matthew Juhascik, Ph.D., DABFT

TOXTALK® **Deadlines** for Contributions:

February 1 for March Issue

May 1 for June Issue

August 1 for September Issue

November 1 for December Issue

Future S.O.F.T. Meeting Destinations:

2014:	Grand Rapids, MI	Oct. 18-25th, 2014	Ben Kuslikis/Michael Smith
2015:	Atlanta, GA	Oct. 17-25th, 2015	Robert Sears
2016:	Dallas, TX	Oct. 15-23rd, 2016	Chris Heartsill/Erin Spargo
2017:	Boca Raton, FL	Sept.. 10-15th, 2017	Ruth Winecker/Dan Anderson
2018:	Minneapolis, MN	Oct. 15-12th, 2018	Loralie Langman
2019:	San Antonio, TX	Oct..11-18th, 2019	TBD

TOXTALK® is the official publication of the Society of Forensic Toxicologists, Inc. It is published quarterly for its members. It is each member's responsibility to report change of address and email information to the SOFT Administrative Office. To submit articles, address and email changes, please email TOXTALK@soft-tox.org.